BRITISH COLUMBIA
MINISTRY OF FORESTS

Tree Farm Licence 47

Issued to TFL Forest Ltd.

Rationale for Allowable Annual Cut (AAC) Determination

Effective August 1, 2003

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Objective of this document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for Tree Farm Licence (TFL) 47. This document also identifies where I believe new or better information is needed for incorporation in future determinations.

Description of the TFL

TFL 47 is held by TFL Forest Ltd. (the licensee) and consists of three management units (MU) on the mainland, Vancouver Island, and the Queen Charlotte Islands. TFL 47 is located within the British Columbia Forest Service (BCFS) Coast Forest Region and is administered from the district offices in Campbell River, Port McNeill and Queen Charlotte City.

When the timber supply analyses was accepted in January 2002, the TFL covered 167 021 hectares, of which 149 068 hectares, or 89 percent was productive forest land. Of the productive forest, 112 866 hectares was considered available for timber harvesting. This represented 68 percent of the total area of TFL 47 at the time.

On June 25, 2003, a significant area was deleted from TFL 47 in order to remove operations of the Small Business Forest Enterprise Program (now British Columbia Timber Sales) from the TFL. As a result of this deletion, the TFL now covers a total of 161 077 hectares and the area considered to be available for timber harvesting is 109 282 hectares. I will discuss this further under *'Land Base Contributing to Timber Harvesting, BC Timber Sales area'* and *'Reasons for Decision.'* Otherwise in this rationale, except where specifically mentioned, the information and my considerations will be based on the TFL area before the deletion took place.

Most of the TFL lies within the Coastal Western Hemlock (CWH) biogeoclimatic zone, and western hemlock is the predominant tree species. Approximately 75 percent of the timber harvesting land base is covered with stands younger than 80 years of age, 17 percent with stands older than 250 years of age and the remaining 8 percent with stands between 80 and 250 years of age.

The three MUs in the TFL are known as the Johnstone Strait, Bonanza Lake, and Moresby Island MUs.

The Johnstone Strait MU, located in the vicinity of the communities of Campbell River and Sayward, includes islands in the Johnstone Strait and some area on the adjacent mainland. Timber harvesting began in this MU in the early 1900s. Ninety percent of the Johnstone Strait MU is considered productive forest, and 72 percent, or 73 216 hectares, is considered available for timber harvesting. This MU represents almost two-thirds of the total TFL timber harvesting land base.

The Bonanza Lake MU is located on northern Vancouver Island near the communities of Port McNeill, Alert Bay, Sointula, Beaver Cove and Telegraph Cove. Harvesting operations started within this unit in the 1940s. Productive forest land comprises

86 percent of the Bonanza Lake MU, and 58 percent, or 22 086 hectares, is considered available for timber harvesting. This MU accounts for almost 20 percent of the total timber harvesting land base of the TFL.

The Moresby Island MU is located immediately adjacent to the community of Sandspit on Moresby Island in the Queen Charlotte Islands. The majority of timber harvesting in this MU has occurred within the last 50 years. Ninety-three percent of the Moresby Island MU is considered productive forest. About 65 percent, or 17 564 hectares, is considered available for timber harvesting, constituting about 16 percent of the total TFL timber harvesting land base.

Although the entire TFL is held in the name of TFL Forest Ltd., that company has a private-sector arrangement with Teal Cedar by which the latter company is the effective manager of the Moresby Island MU. For that reason, this document will frequently refer to activities carried out, and information provided by, Teal Cedar Products Ltd., hereafter referred to as Teal Cedar.

History of the AAC

In January 1985, TFL 2 and TFL 12 were amalgamated to form TFL 47, which was then issued to Crown Forest Industries Limited. At that time, the AAC was determined at 1 090 000 cubic metres. In 1988 and 1989, in response to new provisions of the *Forest Act*, a total of 37 050 cubic metres of the AAC was allocated to the Ministry of Forests' Small Business Forest Enterprise Program (SBFEP).

In 1991, the AAC was reduced to 748 050 cubic metres in part because at that time facilities were not yet available to economically process the significant amount of second-growth timber covering the Johnstone Strait MU. In December 1992, in order to move the SBFEP into the adjacent Strathcona Timber Supply Area (TSA), a portion of the TFL area was deleted and added to the TSA. Consequently the AAC for the TFL was reduced by 37 050 cubic metres to 711 000 cubic metres.

By 1996, to reflect improved economics of harvesting and milling second-growth stands, the AAC was determined at 865 000 cubic metres. In 1998, as a result of a transfer in licence ownership, the licensee's portion of the AAC was reduced to 836 758 cubic metres, and the difference, 28 242 cubic metres per year, was allocated to the SBFEP.

On January 1, 1999, two large areas of private land near Nanaimo Lakes and Courtenay were deleted from the TFL as part of a land exchange agreement with the provincial government. These MUs covered almost 54 000 hectares of Schedule A (private) land. As a result of this deletion the AAC was reduced to 725 000 cubic metres.

In May 2002, the Lieutenant Governor in Council defined certain areas in the central coast as being "designated areas" under Section 169 of the *Forest Act*. Accordingly, under the provisions of Section 173 of the *Act*, the chief forester reduced the AAC by 8000 cubic metres, and the current AAC for TFL 47 is 717 000 cubic metres.

New AAC Determination

Effective August 1, 2003, and before accounting for the continuing reduction under Section 173 of the *Forest Act* as mentioned above, new AAC for TFL 47 will be 780 000 cubic metres, representing an increase of 7 percent from the current AAC. I have attributed the AAC to each of the TFL's three Management Units according to the following table:

Area	AAC attribution (cubic metres)
Johnstone Strait Management Unit	500 000
Bonanza Lake Management Unit	180 000
Moresby Island Management Unit	100 000
Total TFL AAC	**780 000**

In the Moresby Island Management Unit, I specify that no more than 60 000 cubic metres of old-growth timber should be harvested per year, on average, for the period during which this AAC is in effect.

Temporary Reduction

The Central Coast Designated Area Regulation came into effect on May 23, 2002. Hanson Island within the Johnstone Strait MU was included in the areas designated under this regulation. Therefore, on July 3, 2002 as mentioned above, the chief forester signed an order reducing the AAC for TFL 47 by 8000 cubic metres. He attributed this reduction to the Johnstone Strait MU. The order is still in effect, and therefore, the effective AAC for TFL 47 will be 772 000 cubic metres and the portion attributed to the Johnstone Strait MU will be 492 000 cubic metres.

If the designated areas in TFL 47 cease to be designated before the next AAC is determined, the current 8000 cubic metre reduction will cease, and the AAC for TFL 47 will become 780 000 cubic metres. At that time the portion of the AAC attributed to the Johnstone Strait MU will be 500 000 cubic metres.

This AAC will remain in effect until a new AAC is determined, which must take place within five years of this determination unless the determination is formally postponed according to the provisions of Section 8 of the *Forest Act*.

Information sources used in the AAC determination

Information considered in determining the AAC for TFL 47 includes the following:

- *Statement of Management Objectives, Options and Procedures (SMOOP) for Management Plan (MP) No. 3,* Tree Farm Licence 47, accepted May 21, 1999;

- *Management Plan No. 3, TFL No. 47, Johnstone Strait and Bonanza Lake Management Units Timber Supply Analysis Information Package* revised December, 2001, and *Tree Farm Licence 47 Block 18, Moresby Block, Timber Supply Analysis Information Package* revised December, 2001;
- Existing stand yield tables for the Johnstone Strait and Bonanza Lake MUs of TFL 47, accepted by the Ministry of Sustainable Resource Management (MSRM) Terrestrial Information Branch (formerly the British Columbia Forest Service (BCFS) Resources Inventory Branch) on October 31, 2000, and for the Moresby Island MU on March 13, 2000;
- Managed stand yield tables and site index estimates for the Johnstone Strait and Bonanza Lake MUs of TFL 47, accepted by BCFS Research Branch on February 21, 2000, and for the Moresby Island MU on October 4, 2001.
- *Tree Farm License No. 47, Management Plan #3, Timber Supply Analysis,* TFL Forest Ltd., and *Timber Supply Analysis for Tree Farm Licence No. 47, Block 18, Moresby Block,* Teal Cedar Products Ltd., Managing Agent for TFL Forest Ltd, accepted January 22, 2002;
- *Tree Farm Licence 47, Management Plan No. 3,* Part A (Bonanza Lake and Johnstone Strait MUs), Part B (Moresby Island MU), approved March 1, 2002;
- Twenty-year Plan for compartments 1, 2, 3 and 17 (Bonanza Lake MU), accepted July 17, 2000; for the Johnstone Strait Division (Johnstone Strait MU), accepted July 24, 2001; for block 18 (Moresby Island MU), accepted September 13, 2001;
- *Tree Farm Licence 47 (Part 'A') 2002 Annual Report;*
- *Vancouver Island Summary Land Use Plan,* February, 2000;
- *Vancouver Island Land Use Plan Higher Level Plan Order,* Province of British Columbia (B.C.), December, 2000;
- *Central Coast Land and Coastal Resource Management Plan,* Province of B.C., April 2000;
- *Protocol Agreement on Land Use Planning, Interim Measures,* Province of B.C., April 2000;
- *Cedar Strategy Plan,* Namgis First Nation, October 28, 2002;
- Observations during a tour of Moresby Island Management Unit on February 13, 2003;
- *Spatial Mapping Assessment for the AAC Determination for Moresby Block, TFL 47,* Council of the Haida Nation, March 14, 2003;
- *Landscape scale mapping and stewardship planning of habitats critical to the presence of COSEWIC and Provincially listed species that breed in forests on the Haida Gwaii/Queen Charlotte Islands, in areas where those habitats are most at risk,* Frank Doyle MSc, March 2003;

- Technical review and evaluation of current operating conditions on TFL 47 through comprehensive discussions with BCFS and Ministry of Water Land and Air Protection (MWLAP) staff, notably at the AAC determination meeting held in Nanaimo on July 25 and 26, 2001 and the supplemental meeting held in Nanaimo on November 2, 2001;
- Technical review and evaluation of the area deleted from TFL 47 under Section 56(9)(b) of the *Forest Act* through comprehensive discussions with BCFS staff, notably at a meeting held in Victoria on May 8, 2002;
- Technical information provided through correspondence and communication among staff from BCFS and MWLAP;
- Summary of public input solicited by the licensee regarding the contents of Management Plan No. 3;
- Letter from the Minister of Forests to the Chief Forester, dated July 28, 1994, stating the Crown's economic and social objectives;
- Memorandum from the Minister of Forests to the Chief Forester, dated February 26, 1996, stating the Crown's economic and social objectives with regard to visual resources;
- Letter from the Deputy Ministers of Forests and the former Ministry of Environment, Lands and Parks (MELP), dated August 25, 1997, conveying government's objectives regarding the achievement of acceptable impacts of biodiversity management on timber supply;
- Memorandum from the Director of Timber Supply Branch of the Ministry of Forests, dated December 1, 1997, titled *Incorporating Biodiversity and Landscape Units in the Timber Supply Review;*
- *Forest Practices Code of British Columbia Act*, consolidated to May 2002;
- *Forest Practices Code of British Columbia Act Regulations and Amendments*, current as of May 2002;
- *Landscape Unit Planning Guide*, BCFS and MELP, March 1999;
- *Higher Level Plans: Policy and Procedures*, BCFS and MELP, December, 1996;
- *Forest Practices Code of British Columbia Guidebooks*, BCFS and MELP;
- *Identified Wildlife Management Strategy,* Province of B.C., *February 1999;*
- *Managing Identified Wildlife: Procedures and Measures, Volume 1, February 1999.*

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis, and the inventory and growth and yield data used as inputs to the analysis, typically form the major body of technical information used in AAC determinations. Timber supply analyses and associated inventory information are concerned primarily with biophysical

factors—such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices.

However, the analytical techniques used to assess timber supply are necessarily simplifications of the real world. There is uncertainty about many of the factors used as inputs to timber supply analysis due in part to variations in physical, biological, and social conditions, although ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of this uncertainty.

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural, and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily provide complete answers or solutions to forest management problems such as AAC determinations. The information does, however, provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information required to be considered in AAC determinations.

In determining the AAC for TFL 47, I have considered known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for TSAs and TFLs. Section 8 is reproduced in full as Appendix 1.

In accordance with Section 23(3) of the *Interpretation Act*, the deputy chief forester is expressly authorized to carry out the functions of the chief forester, which include those required under Section 8 of the *Forest Act*.

The chief forester has expressed the importance of consistency of judgement in making AAC determinations. I also recognize the need for consistency of approach. I have observed the chief forester during a number of previous AAC determinations and am familiar with the guiding principles that the chief forester has employed in making AAC determinations. I find these principles to be reasonable and appropriate and I have adopted them as described below in making my AAC determination for TFL 47.

Guiding principles for AAC determinations

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. When a large number of determinations are made for many forest management units over extended periods of time, administrative fairness requires a reasonable degree of consistency of approach in incorporating these changes and uncertainty. To make his approach in these matters explicit, the chief forester has compiled a set of guiding principles for AAC determinations. I have reviewed these principles and find them to be reasonable, and thus I have adopted and applied them as deputy chief forester in AAC determinations for TFLs. These principles are set out

below. If in some specific circumstance it may be necessary to deviate from these principles, I will provide a detailed reasoning in the considerations that follow.

Two important ways of dealing with uncertainty are:

(i) minimizing risk, in respect of which in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and

(ii) re-determining AACs frequently, to ensure they incorporate current information and knowledge, a principle that has been recognized in the legislated requirement to re-determine AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires the chief forester to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation of current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to increase the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or to factors that could work to reduce the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the *Forest Practices Code of British Columbia Act* and its associated regulations (the Forest Practices Code).

The *Forest Practices Code of British Columbia Regulations* were approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995.

Although the Forest Practices Code has been fully implemented since the end of the transition period on June 15, 1997, the timber supply implications of some of its provisions, such as those for landscape-level biodiversity, still remain uncertain, particularly when considered in combination with other factors. In each AAC determination the chief forester takes this uncertainty into account to the extent possible in the context of the best available information. In making my determination for TFL 47, as deputy chief forester, I have followed the same approach.

More recently, on November 21, 2002, government passed the new *Forest and Range Practices Act*, which is expected to take effect in late 2003, ultimately replacing the *Forest Practices Code of British Columbia Act*. As the timber supply implications of this new *Act* and any pursuant regulations become clear and measurable, they will be accounted for in AAC determinations. Uncertainties will continue to be handled as they have been under the current legislative regime.

As British Columbia progresses toward completion of strategic land-use plans, the timber supply impacts associated with the land-use decisions resulting from the various planning processes are important to AAC determinations. Where specific protected areas have been designated by legislation or by order-in-council, these areas are no longer considered to be part of the timber harvesting land base or to contribute to the timber

supply in AAC determinations.

Because the outcomes of planning processes are subject to significant uncertainty until formal approval by government, it has been and continues to be the position of the chief forester that in determining AACs it would be inappropriate to attempt to speculate on the timber supply impacts that will eventually result from land-use decisions that have not yet been taken by government. I consider this approach to be reasonable and appropriate. Like the chief forester, I will therefore not take into account the possible impacts of existing or anticipated recommendations made by such planning processes, nor attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made a formal land-use decision, it may not always be possible to fully analyze and account for the consequent timber supply impact in a current AAC determination. In many cases, government's land-use decisions must be followed by a number of detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. Nevertheless, the legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing plan implementation decisions.

The Forest Investment Account (FIA) and its predecessor Forest Renewal British Columbia funded a number of intensive silviculture activities that have the potential to affect timber supply, particularly in the long term. As with all components of an AAC determination, like the chief forester, I require sound evidence before accounting for the effects of intensive silviculture on possible harvest levels. Nonetheless, I will consider information on the types and extent of planned and implemented practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of any timber supply effects of intensive silviculture.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AACs in the province between 1992 and 1996. In any case, the data and models available today are improved from those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, the chief forester should immediately reduce some AACs in the interest of caution. However, any AAC determination made by the chief forester or myself must be the result of applying our individual judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I have made allowances for risks that arise because of uncertainty.

Overall, in making this AAC determination, as deputy chief forester, I am mindful of the mandate of the Ministry of Forests as set out in Section 4 of the *Ministry of Forests Act* and of the chief forester's responsibilities under the *Forest Practices Code of British Columbia Act* and the *Forest Act*.

Guiding principles with respect to First Nations

With respect to First Nations' issues, I am aware of the Crown's legal obligations, particularly as clarified in judgements by the Supreme Court of Canada and the British Columbia Court of Appeal. The AAC that I have determined should not in any way be construed as limiting those obligations under those decisions.

The British Columbia Court of Appeal decided in March 2002 that the Crown has an obligation to consult with First Nations with respect to asserted rights and title in a manner proportional to the apparent strength of the claimed interests. As a matter of course, I consider any information brought forward by all parties respecting First Nations' interests. In particular I consider information related to actions taken to protect interests, including operational plans that describe forest practices designed to address First Nations' interests. In this context, I stress that my AAC determination does not prescribe a particular plan of harvesting activity, nor does it involve allocation of the wood supply to any particular party.

Subsequent to a determination, if I become aware of information respecting First Nations' interests that would substantially alter my understanding of relevant circumstances, I may revisit my determination sooner than as required by the *Forest Act*.

The role of the base case

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me as part of the Timber Supply Review program.

For each AAC determination for a TFL a timber supply analysis is carried out using an information package including data and information from three categories — land base inventory, timber growth and yield, and management practices. Using this set of data and a computer model, a series of timber supply forecasts is produced, reflecting different starting harvest levels, rates of change over time, and potential trade-offs between short- and long-term harvest levels.

From this range of forecasts, one is chosen which attempts to avoid excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. This is known as the 'base case' forecast, and forms the basis for comparison when assessing the effects of uncertainty on timber supply.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast for a TFL is not a portrayal of AACs over time. Rather, it is one possible forecast of timber supply, whose validity — as with all the other forecasts provided — depends on the validity of the data and assumptions incorporated into the computer

simulation used to generate it. In some cases, an AAC is determined that coincides with the base case starting point. In other cases, an AAC is determined which differs significantly from the modelled starting point.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which the assumptions made in generating the base case forecast are realistic and current, and the degree to which I believe its predictions of timber supply should be adjusted to more properly reflect the current situation.

These adjustments are made on the basis of informed judgement, using current available information about forest management, which may have changed since the original information package was assembled. Forest management data are particularly subject to change during periods of legislative or regulatory change, or during the implementation of new policies, procedures, guidelines or plans.

Thus it is important to remember, in reviewing the considerations which lead to the AAC determination, that while the timber supply analysis with which I am provided is integral to those considerations, the AAC determination itself is not a calculation but rather is a synthesis of analysis and judgement in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the initial harvest level in a base case forecast. Judgements that may be based in part on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation may be gained by attempting a computer analysis of the combined considerations to confirm the exact AAC determined.

Timber supply analysis

The timber supply analysis for TFL 47 consists of a separate analysis for each of the three MUs. The licensee for TFL 47 conducted the analyses for the Johnstone Strait and Bonanza Lake MUs, and Teal Cedar conducted the analysis for the Moresby Island MU.

The forest estate model COMPLAN was used to conduct all the analyses. This simulation model was developed by Olympic Resource Management, and can be used either in its spatially implicit or spacially explicit mode. For TFL 47, COMPLAN was used in the spatially implicit mode, meaning that the rules governing the harvesting of adjacent stands were implicitly accounted for in the model using forest cover requirements rather than explicitly tracked over the forecast period based on the geographic relationship of mapped harvested and reserved areas.

For the Moresby Island MU, Teal Cedar also provided a base case using the spatially explicit mode of COMPLAN. My confidence in the model used for the base case was strengthened because the two different modelling approaches yielded similar results.

BCFS staff have reviewed COMPLAN and advise me that this model produces projections of timber supply similar to those produced by the BCFS model, FSSIM. Furthermore, I have reviewed timber supply projections produced by COMPLAN for other TFLs. Based on my staff's and my own experience with this model, I am satisfied that it is suitable for projecting the timber supply for TFL 47.

The timber supply analyses incorporated assumptions based on the licensee's and Teal Cedar's assessment of the best available information on current forest management, land base and timber yields for the TFL. These assumptions are discussed more fully in the information package and in the timber supply analysis which form an integral component of the licensee's Management Plan (MP) No. 3.

In the base case for the Johnstone Strait MU, an even-flow harvest level of 559 350 cubic metres per year (net of a one-percent provision for non-recoverable losses) was maintained over the forecast period. This level is 32 percent higher than the portion of the current AAC (425 600 cubic metres) attributed to the Johnstone Strait MU.

In the base case for the Bonanza Lake MU, a harvest level of 188 100 cubic metres per year (net of a one-percent provision for non-recoverable losses) was projected for the first 20 years of the forecast period. The projected harvest level then declined by approximately 7 percent per decade for three decades to a mid-term harvest level of 146 400 cubic metres per year. It then increased gradually starting in decade 8 and attained the long-term harvest level of 163 350 cubic metres per year in the twentieth decade. The initial harvest level in the base case is 6 percent less than the 200 000 cubic metre annual harvest level currently attributed to the Bonanza Lake MU.

In the base case for the Moresby Island MU the initial harvest level of 109 760 cubic metres per year (net of a two-percent provision for non-recoverable losses) was maintained for the first four decades. Following this initial period, the harvest level for this MU was projected to increase periodically until a long-term harvest level of 131 321 cubic metres per year was attained in the fifteenth decade. The initial harvest level in the base case was 9.8 percent higher than the MU's contribution of 100 000 cubic metres to the current AAC.

In accordance with the *Forest Act*, AAC determinations must be made for each tree farm licence area in its entirety. To assist in my consideration of socio-economic factors, such as community stability, the licensee provided a separate analysis for each MU. However, the licensee did not provide a harvest forecast for the TFL as a whole. In order to provide me with the information I need to consider the timber supply dynamics of the entire TFL, BCFS staff summed the base case forecasts for the three MUs and provided me with an aggregated forecast representing the base case timber supply projection for the whole TFL. I have considered this forecast, and the uncertainty of the assumptions used relative to this forecast, in making my determination.

In the BCFS summary forecast the total initial harvest level for TFL 47 was 857 210 cubic metres per year and was maintained for the first two decades of the harvest forecast. The harvest level then declined until it reached a level of 827 460 cubic metres per year, approximately 4 percent less than the initial harvest level, starting in the fourth decade. In the eighth decade the forecast began to increase in increments reaching the long-term harvest level of 863 870 cubic metres per year in the 16th decade. The initial harvest level attained in the base case for TFL 47 is 18 percent higher than the current AAC for TFL 47 of 725 000 cubic metres. I am particularly mindful that, with an increase of this magnitude, the harvest level for TFL 47 is projected to decline in twenty years. I will consider this under '*Reasons for Decision*'.

In the timber supply analysis, various sensitivity analyses were conducted to assess the potential implications for timber supply arising from uncertainty in data assumptions and estimates. These sensitivity analyses have assisted me in considering any uncertainty regarding the factors leading to my determination. Subject to my considerations of uncertainty about factors discussed within this rationale, I accept that the base case is a reasonable starting point for my determination.

I note that while the base case is a reasonable projection of timber supply for use in this AAC determination, the base case did not include an explicit accounting of the licensee's intent to manage portions of the Johnstone Strait and Bonanza Lake MUs using the retention silviculture system. Nor did the base case reflect constraints on timber supply arising from the establishment, under the *Vancouver Island Land-Use Plan Order*, of Special Management Zone 19 on Quadra Island. The licensee instead provided its estimate of timber supply impacts relative to the base case and I will discuss these under the relevant sections in this document.

For the Moresby Island MU, the base case was predicated on a clearcut harvesting regime, whereas the actual practice now is to retain a considerable portion of the growing stock on most harvested areas. As explained later in this document, I believe this is a significant factor in assessing the merits of the base case provided to me.

In this rationale, I will discuss several of the analysis assumptions in the context of my considerations for this AAC determination. However, where my review of an assumption has concluded that I am satisfied it was appropriately modelled in the base case, I will not discuss my considerations in detail in this document, other than to note my agreement with the approach that is already documented in the licensee's analysis report. Some factors for which the assumptions were appropriately modelled in the analysis warrant discussion, however, for other reasons, such as a high level of public input, lack of clarity in the analysis report, or concerns resulting from the previous determination for TFL 47. I will explain my consideration of such factors in this rationale.

Consideration of Factors as Required by Section 8 of the *Forest Act*

Section 8 (8)

In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

Land base contributing to timber harvesting

- general comments

The total area of TFL 47, as estimated in the timber supply analysis using data from the licensee's inventory file, is 167 021 hectares. Of this area, 89 percent, or 149 068 hectares, is productive forest land.

As part of the process used to define the timber harvesting land base (i.e., the land base estimated to be legally, biologically and economically available for harvesting), a series of deductions were applied to the productive forest land. For TFL 47, the deductions result in an assumed timber harvesting land base of 112 866 hectares, or approximately 76 percent of the productive forest land.

The size of the timber harvesting land base at the time of the previous determination was estimated to be 170 738 hectares, 51 percent larger than the current estimate. This difference is largely due to the deletion of the Nanaimo Lakes and Courtenay MUs from TFL 47, as mentioned above.

I have considered all of the deductions applied in the derivation of the timber harvesting land base in the base case. I have also examined the concerns brought forward through public comments, particularly with respect to the Johnstone Strait MU. For this determination, I accept without further discussion the assumptions concerning non-forested and non-productive areas, non-commercial brush sites, problem forest types and areas deducted to account for recreation concerns.

Where I believe an assumption in the base case is incorrect, or does not represent current practice, or where I believe a factor requires discussion, it is presented in the following sections of this rationale.

- BC Timber Sales area deletion

As discussed above under *'History of AAC'*, in 1998 the licensee's portion of the AAC was reduced by 28 242 cubic metres as a result of a transfer in licence ownership. This volume was allocated to the SBFEP. On June 25, 2003, pursuant to section 56(9)(b) of the *Forest Act,* an area was deleted from TFL 47 that I deemed capable of producing no more than the 28 242 cubic metres allocated to the SBFEP.

The deletion area covers a total of 5944 hectares, with 5504 hectares being deleted from the Johnstone Strait MU and 440 hectares from the Moresby Island MU. The associated reduction in deriving the timber harvesting land base for TFL 47 is 3584 hectares, with 3233 hectares being removed from the Johnstone Strait MU and 351 hectares from the Moresby Island MU.

On May 8, 2002 I reviewed the contribution of the deletion areas to the AAC of TFL 47. I noted that, while the information presented to me indicated the areas contribute 29 196 cubic metres per year (somewhat more than 28 242 cubic metres per year), this estimate had not accounted for non-recoverable losses and the construction of future roads. In addition, the approximation used to account for visually sensitive areas in the deletion areas was less constraining than the assumption used in the last analysis for TFL 47. I therefore concluded that the deletion areas in fact contribute between six and seven percent less than the estimate provided, and therefore somewhat less than 28 242 cubic metres per year to the TFL 47 timber supply.

For this determination I consider the deletion of these areas to reduce timber supply on TFL 47 by approximately 27 000 cubic metres per as discussed under *'Reasons for Decision'*. For the purposes of this determination, I have allocated 24 500 cubic metres of the reduction to the Johnstone Strait MU and 2500 cubic metres per year to the Moresby Island MU.

- protected areas

No protected areas have been declared or proposed through a land-use planning process within the Bonanza Lake and Moresby Island MUs. However, four protected areas totalling 2685 hectares within the Johnstone Strait MU, were identified in the *Vancouver Island Summary Land Use Plan* (VISLUP) and subsequently established as class A parks through order-in-council. These areas were excluded in the derivation of the timber harvesting land base in the base case.

Under the Central Coast Land and Resource Management Plan (CCLRMP), four candidate protection areas were identified within the Johnstone Strait MU of TFL 47. The Central Coast LRMP Table is recommending that three of the areas be protected, namely the Thurston Bay Extension, Forward Harbour and Boat Bay. They cover a total of 1123 hectares.

Effective May 23, 2002, under the Central Coast Designated Area Regulation, the Lieutenant Governor in Council defined certain areas within the area covered by the CCLRMP as being 'designated areas'. As mentioned earlier, Hanson Island was included as a 'designated area' because of the extensive interest in the area expressed by First Nations. The island covers a total of 1403 hectares in the Johnston Strait MU. The timber harvesting land base was estimated to be 1094 hectares.

On July 3, 2002, pursuant to section 173(2) of the *Forest Act,* which specifies that the chief forester may reduce the AAC of a TFL area if all or part of the area is a 'designated area', the chief forester signed an order reducing the AAC for TFL 47 by 8000 cubic metres to account for the 'designation' of Hanson Island. He attributed the reduction to the Johnstone Strait MU. On July 25, 2003, government extended the term of the 'designated areas' to June 30, 2004.

In the base case for the Johnstone Strait MU the licensee assumed all four proposed protection areas, including Hanson Island, contribute to timber supply. In fact, their future status remains uncertain until government makes a land-use decision respecting these areas. It was therefore appropriate and consistent with my *Guiding Principles* to assume these areas contribute to timber supply in the base case. I have, however, taken the continuing "designated area" AAC reduction into account, as documented under *'Determination'*.

In the event government protects any new areas with TFL 47, or 'designates' areas under Section 169 of the *Forest Act*, I will account for the timber supply implications in a future AAC determination or in an order under section 173(2) of the *Act.*

- economic and physical operability

The portions of a TFL which are not physically accessible for harvesting, or which are not expected to be feasible to harvest economically, are typically categorized as inoperable and are excluded when deriving the timber harvesting land base for timber supply modelling purposes.

I have considered all the deductions applied to account for physically and economically inoperable areas in the derivation of the timber harvesting land base for the Johnstone Strait and Bonanza Lake MUs. For this determination, I accept without further

discussion the assumptions concerning this deduction for these two MUs. I note in particular that virtually the entire timber harvesting land base is suitable for conventional logging techniques. Therefore there exists almost no risk of failure to pursue expensive non-conventional techniques, such as helicopter logging.

For the Moresby Island MU the same procedures and assumptions were used to classify the area for operability that were used for the other two MUs. Using these procedures, stands were assumed to be economically inoperable if the stand volume was less than 250 cubic metres per hectare and the majority of the stems were not 'J' grade or better. Stands with less than 250 cubic metres per hectare that were adjacent to better stands, and stands that, when evaluated for species, grade, stem size and volume, were shown to be worth the associated cost to access them, were assumed to be economically operable and to contribute to the timber harvesting land base.

In the base case for the Moresby Island MU a total of 4115 hectares were identified as being inoperable and excluded from the timber harvesting land base. Within the area identified as being operable, 16 783 hectares were classified as operable using conventional means, 13 hectares using helicopters and 529 hectares using long-line logging techniques.

Since 2001 Teal Cedar has found that the quality of timber in many areas classified as economically inoperable is better than previously thought. The decay, waste and breakage factors applied when determining the sound volume of trees appear to be too high resulting in an underestimate of stand volume. Teal Cedar has therefore harvested several blocks within the area classified in the analysis as inoperable. The areas were harvested using the retention silviculture system described below under *silvicultural systems*, and which I witnessed in my tour of the area in February, 2003.

I have reviewed the operability information for the Moresby Island MU with BCFS and Teal Cedar's staff, including during a tour of the area in February, 2003. I note that the operable land base appears to have been underestimated in the base case on this account. At first blush, this would seem to indicate that timber supply is greater overall than modelled. However, no analysis has been provided to indicate how much of the assumed inoperable land base is in fact operationally viable, or how much of it would have to be netted out because it consists of environmentally sensitive areas, riparian areas, sensitive terrain, etc. Nor has any information been provided to indicate whether this harvesting of misclassified area is having any negative effect on the attainment of landscape-level biodiversity requirements.

Nevertheless, for this determination I believe the timber harvesting land base in the Moresby Island MU may have been underestimated in the base, and I will discuss this under *'Reasons for Decision'*. Unfortunately I have no information that suggests the magnitude of this underestimate. I therefore request that Teal Cedar review its operability mapping and ensure that information that accurately portrays current performance is available for the next determination.

- existing and future roads, trails and landings

In the timber supply analysis, a percentage of the productive forest was excluded from the timber harvesting land base to account for the loss in productive area resulting from

the construction of roads, trails and landings. Separate estimates were made for existing and for future roads, trails and landings, to reflect both current and anticipated access requirements over time.

The licensee used existing road information within a geographic information system (GIS) along with road width estimates to estimate the amount of area covered by existing roads within each MU. For the Johnstone Strait and Bonanza Lake MUs, the licensee assumed that all roads average ten metres in width; for the Moresby Island MU, Teal Cedar assumed that main roads average 20 metres in width, and deactivated roads average ten metres in width. Using this information, a total of 2457 hectares was assumed to be covered with existing roads and this area was excluded in the derivation of the timber harvesting land base.

To account for future road requirements in the Johnstone Strait and Bonanza Lake MUs, the licensee assumed that all areas farther than 200 metres from an existing road would require further road access to allow for timber harvesting. For the Moresby Island MU, Teal Cedar assumed that all stands less than 46 years of age are accessible using the existing road network and only older stands would require further road construction. In each case the area needed for future road access was estimated by calculating the percent of the area accessible using the existing road network that is occupied by existing roads and applying this percentage as a reduction to the area not yet accessed.

A total of 2665 hectares was excluded in the derivation of the long-term timber harvesting land base to account for future road access.

Since the timber supply analysis was completed, Teal Cedar noted that the widths assumed for main roads in the analysis for the Moresby Island MU likely overestimate the real widths of roads in the MU.

BCFS district staff reviewed the assumptions used in the base case to account for the productive area lost to existing and future roads. Staff believe that the assumptions applied for the Johnstone Strait and Bonanza Lake MUs reflect current practice. For the Moresby Island MU, staff concur with the observation made by Teal Cedar that the assumed road widths are likely too great. However, no specific information is available to confirm or quantify this possible overestimate.

Having considered the information about the road widths assumed for the Moresby Island MU, I note that any underestimate in the size of the timber harvesting land base on this account will be small, and poses little risk to the short-term timber supply projected in the aggregated base case. Given that no better estimate is available for that MU, I accept the estimates applied in the base case for both current and future roads, trails and landings as being the best available information for this determination. However, I encourage the licensee to ensure improved road width estimates are available for the next determination.

- deciduous forest types

Deciduous forest types are those dominated by broad-leaved tree species. On TFL 47, red alder is the most common deciduous tree species, although maple is also occasionally found. Pure stands of red alder, as well as stands where alder is the leading species with

lesser components of Douglas-fir and western redcedar, are found on TFL 47. Alder may also occur as a minor component within stands dominated by coniferous tree species.

For the Johnstone Strait MU, the licensee assumed that all alder and alder-conifer mixed stands contribute to timber supply. In the base case these areas cover 4745 hectares, or 6.5 percent of the timber harvesting land base of this MU. Of this area, 969 hectares are covered with stands over 70 years of age, 740 hectares with stands younger than 50 years of age, and 3036 hectares with stands aged from 50 to 69 years.

The licensee notes that merchantable alder is typically between 50 and 70 years old. In the Johnstone Strait MU a total of 3036 hectares of alder-leading stands meet this criterion. These stands contain a total of approximately 1.5 million cubic metres of timber including approximately 825 000 cubic metres of pure alder. Older alder trees tend to be unmerchantable due to decay or poor stem form.

Licensee staff further indicate that merchantable alder stands tend to be located on rich to very rich, and fresh to very moist, sites (site series 05 and 07).

After deducting low quality stands, and stands that are economically less desirable for harvesting by virtue of their being located in small patches or in areas with high access costs, the licensee indicates that 375 000 cubic metres of alder are immediately available for harvest under standard Forest Practices Code provisions and a further 175 000 cubic metres could be harvested in the short term with relaxed green-up requirements for harvested blocks before harvesting of adjacent blocks is allowed. This totals approximately two-thirds of the 825 000 cubic metres mentioned above.

District staff inform me that the currently approved forest development plan contains provisions for relaxed green-up requirements in areas covered with predominantly deciduous tree species. It indicates a total of 230 000 cubic metres of alder is available for harvest over the next five years, or an average of 46 000 cubic metres per year. According to TimberWest's 2002 annual report, from 1997 to 2000 the licensee harvested an average of 29 000 cubic metres of alder on TFL 47. Since then the annual harvest of alder has increased; the licensee harvested 71 000 cubic metres in 2001 and 91 000 cubic metres in 2002. Almost all this volume was harvested on the Johnstone Strait MU. Once harvested, deciduous stands have generally been regenerated to Douglas-fir or western redcedar stands.

BCFS staff contend that in the base case for the Johnstone Strait MU the inclusion in the timber harvesting land base of stands that include a component of alder that the licensee considers to be of doubtful merchantability (older stands and low quality stands) may have caused an overestimate in the base case forecast. According to base case projections, within the next forty years the volume harvested from deciduous-leading stands will rise to approximately 15 percent of the total harvest level for the Johnstone Strait MU.

Having considered the licensee's comments regarding alder merchantability and the concern noted by BCFS staff, I conclude that the 969 hectares of alder-leading stands aged older than 70 years should not be considered as contributing to short-term or mid-term timber supply for this determination. In addition, of the 3036 hectares of alder within the 50- to 69-year age range, I accept the licensee's estimate that approximately

one-third will not be utilized. I also accept that the licensee probably will harvest the remainder of the 50 to 69 year old alder stands in the Johnstone Strait MU before they age to the point of becoming unmerchantable.

Based on this information, I conclude that in the order of 2000 hectares of alder-leading stands (i.e., the 969 hectares of overmature alder-leading stands and approximately 1000 hectares of 50 to 69 year old stands) that were included in the timber harvesting land base in the base case for the Johnstone Strait MU will not contribute to short-term and may not contribute to medium-term timber supply. Through natural succession the conifer understory will likely contribute to timber supply over the longer term; however, no information is currently available to quantify the amount and timing of this contribution.

The licensee provided a sensitivity analysis in which it assumed that the alder-leading stands do not contribute at all to timber supply in the Johnstone Strait MU. In this analysis the base case initial harvest level of 559 350 cubic metres per year could be maintained for four decades. It then declined by 10 percent to approximately 500 000 cubic metres per year, and increased after the fourteenth decade to a long-term harvest level of approximately 531 000 cubic metres per year. Based on this forecast, I expect that with the same assumptions a flat line harvest forecast of approximately 530 000 cubic metres per year could be achieved, or approximately 30 000 cubic metres per year less than the base case. Approximately 40 percent of this difference is attributable to the economically less desirable alder-leading stands. I therefore conclude that the base case for the Johnstone Strait MU has overestimated timber supply by approximately 12 000 cubic metres per year.

In the base case for the Bonanza Lake MU the licensee assumed that 200 hectares of alder and alder-conifer stands contribute to timber supply, comprising about 1 percent of the timber harvesting land base in that MU. According to MP No. 3, the licensee will specifically target deciduous-leading stands for harvesting in the Bonanza Lake MU, though to a lesser extent than in the Johnstone Strait MU where the majority of the deciduous-leading stands on TFL 47 are located.

No specific sensitivity analysis was conducted to evaluate the implications for timber supply of excluding the alder-leading stands in the Bonanza Lake MU from the timber harvesting land base. Based on the information provided, I conclude that, as there are limited plans to harvest alder volume in the Bonanza Lake MU, 200 hectares of alder-leading stands in that MU should have been excluded from contributing to timber supply in the base case.

For the Moresby Island MU, the total area of alder and alder-conifer stands assumed to contribute to timber supply is approximately 350 hectares, or 2 percent of the timber harvesting land base of this MU. In MP No. 3 (part B) Teal Cedar indicates that in this MU, alder harvest is presently negligible and tends to be an incidental component of the conifer harvest. District staff advise me that Teal Cedar harvests and utilizes no alder in this unit.

Teal Cedar provided a sensitivity analysis which illustrated that excluding the small area of deciduous forest types from the Moresby Island MU timber harvesting land base increased short- and mid-term timber supply by 1000 cubic metres per year, which is

counter-intuitive. According to the licensee, with the alder areas removed, conifer stands with greater volume per hectare than the deciduous-leading stands are ultimately available and harvested in the model, thereby allowing for a small increase in timber supply in the short and mid-terms.

Based on the current lack of deciduous harvesting in this MU, I conclude that the 350 hectares of alder-leading stands in the Moresby Island MU should also have been excluded from contributing to timber supply in the base case.

In considering the contribution of alder-leading stands to the timber supply of TFL 47, I understand that the licensee has an agreement with Northwest Hardwoods to supply it with 30 000 cubic metres of alder per year for the next five years. Based on this information, I am satisfied that the licensee has harvested adequate alder volumes over the term of MP No. 2, that a market for alder volume exists, and that the licensee intends to continue to harvest alder in the foreseeable future.

Having reviewed the information for the three MUs, for TFL 47 as a whole I conclude that the short-term harvest level has been overestimated by up to 15 000 cubic metres per year and I will discuss this further under *'Reasons for Decision'*. I note that the component of this overestimate resulting from inclusion of alder-leading stands in the Bonanza Lake and Moresby Island MUs is relatively small. When information becomes available to quantify the timber supply implications of natural succession in alder-leading stands, it can be accounted for in future determinations.

In the previous rationale for allowable annual cut determination for TFL 47 the chief forester indicated that the harvesting performance in deciduous stands would be evaluated as part of this determination and that the need for a partitioned harvest may be considered. Given the recent harvesting performance in alder-leading stands, I see no need to attribute a portion of the AAC to deciduous-leading stands for this determination.

- low productivity sites

In the analysis, areas considered to be of low site productivity were excluded in the derivation of the timber harvesting land base. For the Johnstone Strait and Bonanza Lake MUs, sites were considered to be of low productivity if the stands yielded less than 250 cubic metres per hectare at culmination age using yield projections from the Variable Density Yield Prediction (VDYP) model. For the Moresby Island MU, areas with low site productivity were identified based on species-specific site index values as classified in the forest inventory. For TFL 47, the total area deducted on this account was 1970 hectares.

BCFS district staff are satisfied that the deductions applied to account for low sites are reasonable and reflective of current harvesting practices. However, they note that the area deducted includes stands that are very close to the merchantability limit and these stands may be harvestable under favourable economic conditions.

Having considered the information, I note that if these stands do prove to be merchantable over time, they can be included in the timber harvesting land base in a future analysis. For the purposes of this determination, I accept the base case assumptions as the best available information, and make no adjustments.

- environmentally sensitive areas and terrain stability

An environmentally sensitive area (ESA) is an area identified in the forest inventory as sensitive to disturbance and/or with significant value for soils, regeneration, wildlife, water, or recreation resources. ESA classifications of E1 (highly sensitive) or E2 (moderately sensitive) are used to identify areas that should be excluded from the timber harvesting land base where more specific or detailed information is not available about a particular forest resource.

I have considered all the deductions applied to account for ESAs in the derivation of the timber harvesting land base for the Johnstone Strait and Bonanza Lake MUs. For this determination, I accept without further discussion the assumptions concerning this deduction for these two MUs.

For the Moresby Island MU, Teal Cedar used its ESA inventory completed in 1992/93 and terrain stability mapping completed in 1996 as the basis for excluding 2538 hectares of areas considered sensitive to timber harvesting.

District staff point out that, in deriving the modelled timber harvesting land base for the Moresby Island MU, an ESA covering 135 hectares was excluded for marbled murrelet habitat. They also note that MWLAP staff are reviewing the Skidegate Lake landscape unit (LU) for potential wildlife habitat areas (WHAs) to be established for marbled murrelet. District staff contend that because no WHAs have yet been established, it was premature to exclude the 135 hectares from the timber harvesting land base, as opposed to testing the sensitivity of timber supply to the potential establishment of that ESA. I agree with this argument, but have made a provision for the impact of anticipated WHAs, as discussed below under *'identified wildlife'*.

Existing forest inventory

The original forest cover inventory for TFL 47 was initiated in 1969 and completed in 1970. In 1983, just over 10 000 hectares of old-growth stands, and in 1994 about 7 000 hectares of deciduous stands were re-inventoried in the Johnstone Strait MU. A re-inventory of the entire Bonanza Lake MU was initiated in 1988 and entered into the licensee's GIS in 1998.

The inventories for the Johnstone Strait and Bonanza Lake MUs were updated for growth and depletion to January 1, 1998 and for the Moresby Island MU to January 1, 2000.

In 1996, BCFS staff conducted a forest inventory audit of the Johnstone Strait MU, and in 1999 the licensee carried out an audit of the Bonanza Lake MU. There was no statistically significant difference between the inventory volume estimates and the audit results. No inventory audit has been completed for the Moresby Island MU.

Although the BCFS audit did not identify any significant concerns with existing stand volume estimates derived from the forest cover inventory for the Johnstone Strait MU, I am concerned that the base inventory is now over 30 years old and fundamentally unadjusted for anything other than growth and depletion. I am also concerned that the inventory for the Moresby Island MU is more than 30 years old and current volume estimates have not been audited. I strongly suggest that the licensee consider carrying

out a re-inventory for the Johnstone Strait and Moresby Island MUs prior to the next timber supply analysis.

For this analysis, I accept the inventory information used in the base case as the best available, and acceptable for this determination.

I have reviewed the information regarding unmanaged stand volume estimates and I am satisfied that the assumptions in the analysis for this factor were appropriate. As a result, I will not discuss my considerations in detail in this rationale.

Expected rate of growth

I have reviewed the information regarding aggregation procedures, managed stand yields, and operational adjustment factors, and I am satisfied that the assumptions in the analysis for these factors were appropriate. As a result, I will not discuss my considerations in detail in this rationale.

- site productivity estimates

Inventory data include estimates of site productivity for each forest stand, expressed in terms of a site index that is based on a stand's height at a given age. The productivity of a site largely determines how quickly trees grow. This in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the ages at which a stand will satisfy mature forest cover requirements and reach a merchantable size.

The most accurate estimates of site productivity can be derived from measurements in stands aged between 30 and 150 years. In stands aged less than about 30 years (particularly stands less then 15 years), the growth history of trees has not been long enough to allow for accurate measurement of site productivity using conventional site index tools (site curves) with inventory estimates of height and age.

Site productivity estimates derived from measurements of older stands are often underestimated because the trees are well past the age of maximum height growth and may have been affected by disease, insects and top damage. As a result, when site productivity estimates from older stands are used to predict the growth potential of young replacement stands, future stand yield may also be underestimated.

This has been verified in several areas of the province where studies—such as the Old-Growth Site Index (OGSI) 'paired plot' project and the 'veteran' study—as well as results from using the Site Index Biogeoclimatic Ecosystem Classification System (SIBEC) suggest that actual site indices are frequently and significantly higher than those indicated by existing data from old-growth forests. In recent years it has been concluded from such studies that site productivity has generally been underestimated in older inventories; managed stands tend to grow faster than projected by inventory-based site index estimates from old-growth stands.

As no studies have yet been conducted to provide local site index estimates for the three MUs for TFL 47, site indices from the forest inventory were used in the base case forecasts. For the Johnstone Strait and Bonanza Lake MUs, the licensee compared the inventory site indices to the site indices derived using the recently completed Terrestrial

Ecosystem Mapping (TEM) for these two units and broadly based provincial SIBEC estimates from the report *Site Index Estimates by Site Series for Coniferous Tree Species in British Columbia* (1997). For the Johnstone Strait MU the two estimates were almost identical, primarily because of this MU's predominantly second-growth forest cover. Generally, inventory site index estimates in second-growth stands are more accurate than in old-growth stands. For the Bonanza Lake MU, the area-weighted average site index derived using inventory estimates was approximately 10 percent lower than the area-weighted average using the provincial SIBEC estimates. I believe this difference is attributable to the high proportion of older stands in this MU.

The licensee prepared a sensitivity analysis to assess the impact on harvest levels of using provincial SIBEC estimates rather than inventory estimates of site index for the Bonanza Lake MU. This sensitivity analysis showed that if the SIBEC estimates were a more accurate measure of site index for the Bonanza Lake MU, the decline in harvest projected in the base case after the third decade would be somewhat reduced, and long-term timber supply would increase by 6 percent (9900 cubic metres per year).

For the Moresby Island MU, Teal Cedar conducted a sensitivity analysis to assess the impact on timber supply of using site index estimates for spruce from the *Queen Charlotte Island Stump-Site Index Adjustment* study, and the provincial OGSI — veteran study for other species. In this sensitivity analysis short-term timber supply was increased by approximately 3000 cubic metres per year, and long-term timber supply by approximately 13 000 cubic metres per year.

In considering this information and discussing it with BCFS staff, I note that while the licensee has recently completed Terrestrial Ecosystem Mapping for the Johnstone Strait and Bonanza Lake MUs, no studies have yet been conducted to provide local site index estimates. Also, the sensitivity analysis results indicate that the implications for short- and mid-term timber supply from using improved site index estimates are small for the TFL as a whole.

Given the lack of local information and the apparent minimal sensitivity in short- and mid-term timber supply to changes in site index estimates, I conclude that the site index estimates applied in the base case are currently the best available information. Nevertheless, I believe it is likely that site indices have been underestimated for areas of old growth and areas of young stands in the Bonanza Lake and Moresby Island MUs. I will discuss this further under *'Reasons for Decision'*, and I encourage the licensee to further investigate site indices for the next determination.

- select seed

The Forest Practices Code requires the use of the best genetic quality (seed and vegetative material) source available for forest regeneration. Select seed produced from seed orchards is the product of B.C.'s forest gene resource management program, which uses traditional tree breeding techniques to select naturally-occurring, well-adapted, healthy and vigorous trees. Select seed produces trees that grow faster than do those from natural-stand seed, and as a result, a stand composed of such trees has a greater volume at the same age than a natural stand with the same species composition.

In the base cases for the Johnstone Strait and Bonanza Lake MUs, adjustments were applied to managed stand yield tables to account for volume gains from the use of select seed. However, no adjustments were applied in the base case for the Moresby Island MU.

Research Branch staff concur with the adjustments applied to account for the current use of select seed in the base case for the Johnstone Strait and Bonanza Lake MUs.

I have considered the information about the adjustments applied to managed stand yields for the use of select seed. I note that the Forest Practices Code requires the use of select seed where available. BCFS staff provided information detailing the historical use of select seed in the Moresby Island MU. Since 1997, planted western redcedar seedlings have originated exclusively from select seed, and more recently planted western hemlock seedlings have also originated from select seed. I expect the use of select seed in the Moresby Island MU will continue, and as a result its use should be accounted for in this determination. I therefore believe that long-term timber supply has been slightly underestimated on this account, and I will consider this in my *'Reasons for Decision.'*

In the next timber supply analysis, the licensee should reflect the use of select seed in the Moresby Island MU.

- regeneration

For the Johnstone Strait and Bonanza Lake MUs the licensee assumed that all regenerated stands are planted to an initial stand density of 1200 stems per hectare and to the same species composition as the previous, harvested stand. It assumed existing deciduous stands regenerate to Douglas-fir or western redcedar.

For the Moresby Island MU, similar assumptions were applied. BCFS district staff indicate that for this MU, there has been a reliance on natural hemlock restocking of some sites. Staff specialists from Research Branch point out that in areas where hemlock ingress is likely to occur after initial planting, an initial density assumption of 1200 stems per hectare is likely to be lower than reality, and this may result in a slight underestimate of stand yield.

Having considered the information, I note that the ingress of hemlock species could result in higher stand densities and slightly higher yields than estimated, if stocking control is not managed. Nevertheless, given the lack of detailed information that would help to quantify any implications for timber supply and the likelihood that any underestimate in projected yields is small, I accept the regeneration assumptions applied in the base case for this determination. I encourage the licensee to maintain good records of hemlock ingress and stocking control measures, and reflect the implications for stand yields in the next timber supply analysis.

- minimum harvestable ages

In timber supply analysis, estimates are made of the earliest age at which a forest stand is projected to reach a harvestable condition or has met minimum merchantability criteria. These assumptions largely affect when second-growth stands will be available for harvest in the model. In practice and in the model, many forest stands will be harvested later than the age at which they reach minimum merchantability, due to harvest scheduling

constraints associated with the current age structure of the forest, economic considerations, and constraints on harvesting that arise from managing for other forest values such as visual quality, wildlife habitat and water quality.

For the Johnstone Strait and Bonanza Lake MUs, the minimum harvestable ages (referred to as first-entry ages in the timber supply analysis) are based on trees attaining an average diameter at breast height (dbh) of 30 centimetres, and stands attaining a minimum volume per hectare of 300 cubic metres. Where these criteria are not met before stands reach the age at which they achieve their maximum average annual rate of volume production (the age at culmination of mean annual increment or 'culmination age'), then the minimum harvestable age was assumed to be the culmination age. In the analysis, using these assumptions the weighted average minimum harvestable age was 69 years for the Johnstone Strait MU, and 85 years for the Bonanza Lake MU.

For the Moresby Island MU base case, Teal Cedar assumed that the minimum harvestable age of a stand was the age at which 90 percent of the culmination of mean annual increment (CMAI) was attained. The area-weighted average minimum harvest age in the base case modelling was 61 years.

The licensee and Teal Cedar prepared sensitivity analyses to demonstrate the impact on timber supply if alternate minimum harvestable ages were assumed to be appropriate. Reducing the minimum harvestable age by 10 years for the Johnstone Strait MU had no impact on the base case harvest level. Assuming a minimum harvestable age equivalent to culmination age decreased timber supply by approximately 70 000 cubic metres per year after the third decade, but resulted in a higher long-term harvest level compared to the base case.

Reducing the minimum harvestable age for the Bonanza Lake MU by 10 years had no effect on the short-term harvest level attained in the base case. Harvest levels in the mid-term were increased slightly while the long-term harvest level was somewhat decreased. When the minimum harvestable age was set at culmination age, timber supply decreased significantly in the short- and mid-term, but increased in the long term.

For the Moresby Island MU, using a minimum harvestable age equivalent to the age at which stands achieve 80 percent, rather than 90 percent, of the CMAI resulted in a reduced harvest level compared to the base case in the short- and mid-term.

As part of the approval of Management Plan No. 2, the chief forester requested that the licensee report on harvesting performance in stands younger than the minimum harvestable age. At that time the licensee used the same assumptions as for this analysis to determine minimum harvestable age. The information gathered shows that during the period from 1997 to 2000 approximately 60 hectares of younger stands were harvested.

In Management Plan No.3 Teal Cedar indicates that in the Moresby Island MU it may harvest up to 5 percent of the volume in stands younger than the minimum harvestable age to help sustain harvest levels during the transition from old growth to second growth and to meet market opportunities.

District staff have reviewed the assumptions for minimum harvestable ages used in the base case and consider them to represent the best available information and reasonably reflect current practices. I acknowledge that some stands are being harvested at younger

ages-with smaller diameter stems and less volume per hectare-than described by the minimum criteria applied in the analysis. I request that the licensee continue to monitor and report on annual performance in these young stands.

While I am aware that some harvesting is occurring in younger stands, I note that the overall proportion is small, and I do not believe this creates a significant risk to short-term timber supply. I accept the minimum harvestable age assumptions used by the licensee as appropriate for this determination, and I make no adjustments on this account.

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

Expected time for forest to be re-established following harvest

I have reviewed the assumptions applied in the base case regarding impediments to prompt regeneration and not-satisfactorily-restocked areas. I am satisfied that they reflect the best available information and current practice on TFL 47 and are suitable for use in this determination.

(iii) silvicultural treatments to be applied to the area,

Silvicultural treatments to be applied

I have reviewed the information and assumptions regarding incremental silviculture activities conducted on TFL 47, and I am satisfied that current practice was appropriately reflected in the base case. I accept the information as the best available information and suitable for use in this determination.

- silvicultural systems

The licensee and Teal Cedar assumed in the base cases for TFL 47 that all harvesting would occur using the clearcutting, or clearcutting-with-reserves silvicultural systems. This assumption reflected the current harvesting practices on the TFL at the time the information packages were assembled.

In draft Management Plan No.3 (Part A), the licensee commits to phasing out the use of the clearcut silvicultural system on the Johnstone Strait and Bonanza Lake MUs by the year 2004. According to the licensee, it will apply a Variable Retention (VR) system defined by the licensee as a forest management system designed to leave more than half of any harvested area under forest influence and to retain structural elements of stands in patches (group retention) or as individual trees (dispersed retention) for at least one rotation.

On the Johnstone Strait and Bonanza Lake MUs, the licensee proposes to use the dispersed retention system on one-third of the area. Within a given cutblock under this system, 95 percent of the trees are expected to be harvested. The remaining 5 percent are expected to be retained across the cutblock until they are removed when the regenerating stand is available for harvest.

As noted above, the licensee did not include assumptions in the base case to reflect the use of VR silvicultural system. Therefore, to estimate the impact on timber supply of this practice, the licensee assumed that the timber supply contribution of the leave trees under the dispersed retention system would be reduced by 15 percent due to their extended harvest ages. In addition, the licensee assumed that the yield of regenerating stands would be reduced by 5 percent as a result of the shading and edge effects from the presence of the leave trees on the site. Using this information, the licensee calculated that timber supply would be reduced by 5.6 percent compared to the base case resulting from the use of dispersed retention. Application of this reduction to one-third of the land base results in a timber supply impact of 1.9 percent compared to the base case harvest forecasts, or 10 500 cubic metres per year for the Johnstone Strait MU and 3500 cubic metres per year for the Bonanza Lake MU.

The licensee proposes to harvest the remaining two-thirds of the harvestable area in the Johnstone Strait and Bonanza Lake MUs using aggregate retention. Under this system, a maximum of 10 percent of the area in each cutblock will be retained in patches of older trees. The licensee expects that aggregate retention will be accommodated in land base reductions for other factors, such as wildlife tree patches and riparian reserves, and that therefore no incremental reduction to timber supply will result on this account. In addition, the licensee expects no shading-related yield reductions in regenerating stands with aggregate retention levels of 10 percent or less.

Research Branch staff reviewed the licensee's estimates of timber supply impacts resulting from the use of VR, and point out that the licensee's estimates are low compared to estimates used for other management units where VR is practised. They further indicate that no accounting was made for leave trees or patches that may be lost to windthrow or other factors. If not recovered, the loss of these trees would reduce timber supply in the mid- and long-term.

Since the timber supply analysis was done for the Moresby Island MU, Teal Cedar has adopted a harvesting regime consisting of clearcutting for about 30 percent of the area harvested, and the retention silvicultural system for the remaining 70 percent, more or less. It is using its logging contractor's experience from harvesting in Clayoquot Sound under the Clayoquot Sound Scientific Panel Recommendations to develop a similar management regime for this MU. According to Teal Cedar, the purpose of this change in practice is to address the Haida's concerns over protection of a cedar supply and medicinal plants for future generations.

At this time I understand that Teal Cedar Products Ltd, is retaining between 30 and 70 percent of the stems on partial-cut blocks, and is averaging approximately 40 percent retention, distributed proportionately across species, diameter class, and tree class. The current expectation is to harvest the retained stems after one rotation.

The licensee did not provide any assessment of the impact that the adoption of the retention silviculture system on the Moresby Island MU will have on timber supply. I believe it could be significant, and will speak to it under *'harvest profile'*.

In summary, it is clear that the base case modelling of silvicultural systems is out of date, relative to the licensee's Management Plan commitment to adopt Variable Retention on

the Johnstone Strait and Bonanza Lake MUs, and relevant to current practice on the Moresby Island MU.

Having reviewed the information for the Johnstone Strait and Bonanza Lake MUs, I am aware that the effect on yield and timber supply from using VR silvicultural systems is uncertain. I am particularly concerned about the assumed effect of using aggregate VR, given that this system will be applied on two-thirds of the area. To improve volume loss estimates, I ask the licensee to monitor the volume typically retained through the application of variable retention harvesting, and assess the extent to which regenerating stands suffer growth loss because of VR-induced shading. With the full implementation of VR scheduled for 2004, I expect the licensee to use improved volume-loss estimates for the next determination.

I am mindful that no accounting was made for the use of the VR silvicultural system in the base cases for the Johnstone Strait and Bonanza Lake MUs, and that information for other coastal units indicates the impact of VR on timber yield may be greater than the estimates provided by the licensee. Therefore, for this determination I will account for an overestimate of at least 10 500 cubic metres per year in the base case harvest level for the Johnstone Strait MU and 3500 cubic metres per year in the base case harvest level for the Bonanza Lake MU. I will discuss this further, under '*Reasons for Decision*.'

I am particularly mindful that neither the base case nor any sensitivity analyses, reflect the relatively high levels of stand retention now being implemented on the Moresby Island MU. I believe this may have a downward impact on timber supply in the relatively near future, as discussed in detail under *'harvest profile'*.

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

Timber harvesting

- decay, waste and breakage

I have reviewed the information and assumptions regarding decay, waste and breakage as applied on TFL 47, and I am satisfied that the best available information was appropriately reflected in the base case.

- utilization standards and compliance

Utilization standards define the species, dimensions and quality of trees that must be harvested and removed from an area during harvesting operations. In timber supply analysis, the utilization specification defines the minimum merchantable tree size and the portion of a tree that contributes volume to the harvest level.

In the base case for the Johnstone Strait and Bonanza Lake MUs, the licensee assumed utilization standards for all species in stands older than 200 years of age were a minimum of 17.5-centimetre diameter at breast height (dbh) with volume calculated from a 30-centimetre maximum stump height to a 15-centimetre minimum top diameter inside bark. For stands less than 200 years of age, it assumed a minimum 12.5-centimetre dbh, with a 30-centimetre maximum stump height and 10-centimetre minimum top diameter

inside bark. I have no reason to question the utilization assumptions for the Johnstone Strait and Bonanza Lake MUs.

In the base case for the Moresby Island MU, Teal Cedar assumed similar utilization standards, only the differentiation between older and younger stands was assumed to be 120 years rather than 200 years. According to Teal Cedar, it has instituted improved utilization practices, including leaving 15-centimetre stumps rather than the standard stump height of 30 centimetres where possible, and increasing quality control at the falling and bucking phases of harvesting operations. Teal Cedar estimates that these measures result in a two-percent increase in harvest volume. To demonstrate the impact of its asserted improved utilization practices, Teal Cedar provided a sensitivity analysis in which harvested volumes were increased by 2 percent. Timber supply was shown to increase by 2.7 percent in the short- and mid-terms.

District staff indicate, however, that harvesting to this lower stump height has not been consistent. Further, Research Branch staff question whether such stump height reductions indeed generate the indicated volume increases.

In consideration of the information, for the next determination I recommend that the licensee monitor achieved stump heights, and provide more conclusive evidence of the timber supply implications of any confirmed improvements in utilization practices. For this determination I accept the utilization assumptions applied in the base cases for the three MUs as the best available information, and I make no adjustments.

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production,

Integrated resource management objectives

The Ministry of Forests is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are co-ordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

I have reviewed the information and assumptions regarding watershed and riparian management on TFL 47, and I am satisfied that current practice was appropriately reflected in the base case. I accept that the information is the best available and suitable for use in this determination.

- cultural heritage resources

Cultural heritage resources generally include archaeological and traditional use sites. Archaeological sites contain physical evidence of past human activity, whereas traditional use sites may not necessarily contain historical physical evidence but may indicate current use by a First Nation. To help manage for unrecorded archaeological sites, archaeological overview mapping may be conducted to assign high, moderate or

low ratings for archaeological potential within an area. Archaeological overview assessments have been completed for all three forest districts in which TFL 47 lies.

According to the licensee, with the exception of Hanson Island (Block 1) in the Johnstone Strait MU, less than twenty CMTs have been found to date, and only two of these each required a 0.5-hectare buffer to protect them. As discussed previously, Hanson Island was included as a 'designated area' under the Central Coast Designated Area Regulation because of the extensive interest in the area expressed by First Nations. District staff consider it likely that CMTs exist on this island.

No CMTs have been identified in the Bonanza Lake MU and district staff consider it unlikely that any will be found.

In the base case the licensee assumed that any CMTs or other culturally significant items found on the Johnstone Strait and Bonanza Lake MUs could be protected using wildlife tree patches and land base reductions for other resources. Therefore, in the base case for these two MUs no specific accounting was made for cultural heritage resources.

The Hamatla Treaty Society noted that many old village sites are located in the Johnstone Strait MU and that these were not accounted for in the analysis. It further noted that old cedar stumps that had been modified have been found in second-growth stands in this MU. The Namgis First Nation also raised concerns about the level of accounting for CMTs in the Bonanza MU.

To estimate the area to be excluded to protect CMTs in the Moresby Island MU, Teal Cedar used information from a study conducted in the Queen Charlotte Islands TSA. In the study, the area actually reserved for CMTs was measured on 398 cutblocks harvested between 1995 and 1998. According to the study, 6.4 percent of the area was reserved for this purpose.

In the base case modelling for the Moresby Island MU, Teal Cedar excluded 6.4 percent (167.6 hectares) of the area covered by stands older than 250 years, the area where it expects CMTs will likely be located. District staff note, however, that the estimate for the TSA was not based only on old-growth stands because modified stumps and canoe blanks are often found in second-growth stands. In addition, according to the Council of the Haida Nation, there are many archaeology sites, including known village sites within the TFL, which were not accounted for in the analysis. In their view the accounting in the analysis for cultural values and CMTs was insufficient.

I have reviewed the methodology and exclusions applied to account for the known and potential existence of CMTs and other archaeology sites in the three MUs of TFL 47. I believe that, with the 'designated area' status of Hanson Island and the estimates used for the Johnstone Strait and Bonanza Lake MUs being based on the best available information, protection of these resources has been reasonably reflected in the base case. In practice, I expect that CMTs or stumps found during harvesting operations will be protected through strategic location of wildlife tree patches or aggregate retention patches. If the licensee or First Nations find that more area is needed to protect these resources on these two MUs, I would appreciate receiving that documented information prior to the next AAC determination.

Regarding the reduction applied for CMTs and archaeology sites on the Moresby Island MU, I acknowledge that the percent reduction was not applied in strict accordance with the parameters of the study in the nearby Timber Supply Area. However, I also believe that Teal Cedar's practice of retaining significant proportions of most stands it harvests will, in fact, afford protection of CMTs and other culturally significant items and sites. For this determination I am satisfied that the accounting for cultural heritage resources was adequate. I also believe that if any further areas are set aside to protect these resources (i.e., in addition to netdowns already made in the base case modelling), the impact on timber supply will be small.

I encourage the licensee, Teal Cedar and the First Nations to gather information that will ensure that protection of cultural heritage resources is accurately accounted for in the next AAC determination.

- visually sensitive areas

Careful management of scenic areas along travel corridors and near recreational sites is an important IRM objective. Visual quality is important on many areas of TFL 47. Portions of the Johnstone Strait MU—including popular inlets and channels between Desolation Sound and Broughton Archipelago Marine Parks—and the Bonanza Lake MU are visible from pleasure craft and cruise ship routes. Also, the Vancouver Island Highway passes through the Bonanza Lake MU, and the Moresby Island MU borders Skidegate Channel between Moresby and Graham Island. Portions of this MU are visible from Queen Charlotte City and Sandspit.

The Forest Practices Code enables the management of visual resources by providing for scenic areas to be identified and made known, and by providing for the establishment of visual quality objectives (VQOs).

To achieve VQOs, limits are placed on the amount of visible disturbance that is acceptable in visually sensitive areas. Guidelines to meet VQOs include setting a maximum percentage of a landform allowed to be in a disturbed state at any one time, and setting visually effective green-up (VEG) targets that must be achieved before additional harvesting is permitted. VEG refers to the height of a growing forested area where the public perceives it to be satisfactorily greened-up from a visual standpoint. To meet this requirement, the green-up height and associated age for stands within visually sensitive areas might be different than for those within non-visually sensitive areas.

Scenic areas in the Campbell River and North Island-Central Coast Forest Districts have been made known by the district managers. These districts cover both the Johnstone Strait and Bonanza Lake MUs. VQOs have not yet been established in these districts.

In the base cases for these two MUs the licensee grouped the visually sensitive areas by visual quality class (VQC) and visual absorption capability (VAC) and used the maximum allowable percent denudation for each VQC. Visual absorption capability (VAC) refers to the capacity of an area to absorb disturbance. The licensee assigned VEG height for each VQC/VAC combination using a digital terrain model and procedures from the BCFS publication *Procedures for Factoring Visual Resources into Timber Supply Analysis*. District staff concur with the licensee's approach.

I am aware that for the Johnstone Strait MU, the licensee has delineated a 30-metre marine buffer along the shoreline in recognition of this well-used marine interface, and has avoided this area in harvesting operations. This buffer assists in the maintenance of visual landscape objectives as well as riparian management, CMT occurrences and wildlife habitat. The buffer covers 545 kilometres of shoreline for a total exclusion of 978 hectares, which according to district staff reflects operational practice. The marine buffer overlaps with visually sensitive areas that are located along the shore and are managed by full or partial retention of the overstory.

Scenic areas were made known in the Moresby Island MU in 1997, but VQOs were not established. Subsequently, the district manager and the licensee implemented a strategy aimed at optimizing timber supply and visual resource management. The strategy includes using landscape design principles to mitigate visual impacts. According to Teal Cedar, the visually sensitive areas identified in the current inventory are still recognized in current operations. Therefore, in the base case Teal Cedar used the landscape inventory and followed the *Procedures for Factoring Visual Resources into Timber Supply Analysis* to calculate the allowable alteration percent for each viewscape unit. It assumed a VEG height of 6 metres. However, there has been limited experience in managing for visual quality in the Moresby Island MU, and hence I request that the licensee review and record performance with respect to visual management on the Moresby Island MU for the next analysis.

Under the CCLRMP process two Special Management Zones (SMZ) have been proposed in the Johnstone Strait MU. I am aware that there is some uncertainty what the visual constraints will be in some or all of the area covered by the SMZs when the plan is finally implemented. They may remain the same or be more stringent than assumed in the base case.

Having reviewed the information regarding visual quality management and the uncertainty associated with the proposed SMZs under the CCLRMP, I am satisfied that the assumptions applied in the base case are based on the best available, current information and reflect current practice. If SMZs are established in the Johnstone Strait MU and the constraints for visual resources in these areas become more restrictive to timber harvesting, this can be reflected in a future AAC determination.

- wildlife habitat

TFL 47 contains habitat for numerous wildlife species, including important habitat for ungulates such as deer and elk.

The terrain in the Johnstone Strait MU is generally low in elevation and the area experiences relatively little snowfall during winter. Therefore no ungulate winter ranges (UWRs) have been identified in this MU.

In the Bonanza Lake MU sixteen ungulate winter ranges for deer and elk, covering a total of 2037 hectares, were grandparented in 1998 under the provisions of the Forest Practices Code Operational Planning Regulation. In the base case for the Bonanza Lake MU, the licensee applied reduction factors for each of these UWRs based on their elevation range and average annual snowpack. According to Ministry of Water Land and Air Protection (MWLAP) staff, these UWRs are currently being reviewed and revised. However the

total amount of area classified as UWR will not change significantly. MWLAP staff expect the revised UWRs will be established before the next AAC determination.

No ungulate winter ranges have been identified in the Moresby Island MU.

I have reviewed the accounting for UWRs on the three MUs and I am satisfied that the base case assumptions represent current practice.

The Council of the Haida Nation noted that coastal black bears prefer to hibernate in large-diameter western redcedar. I am aware that coastal black bears tend to be dependent upon old-growth structure for hibernation, and that the opportunities for denning in second-growth stands are becoming progressively limited as the large stumps and large old logs decay. According to Management Plan No. 3 (Part B), identified bear dens are retained and buffered outside of the cutblocks, where it is safe to do so. I encourage Teal Cedar to manage for retention of the important stand characteristics that will ensure the black bears continue to have access to suitable denning habitat. I expect these dens will largely be accommodated within wildlife tree patches or in stems retained under the retention silvicultural system currently being employed by Teal Cedar in the Moresby Island MU.

Other than for 'identified wildlife' as discussed below, I am satisfied that the assumptions applied in the base cases for the three MUs provided adequate accounting for wildlife habitat and I have made no adjustments in my determination on this account.

- *identified wildlife*

For wildlife species considered to be at risk, the Conservation Data Centre of British Columbia maintains forest district tracking lists. These lists identify species and plant associations considered to be at risk (i.e., endangered, threatened, vulnerable or sensitive) and which are known to occur, are strongly expected to occur, or which have occurred in the past within a given forest district. The Identified Wildlife Management Strategy (IWMS) addresses habitat management for specific species considered at risk.

Identified wildlife refers to species at risk (red- and blue-listed) as well as regionally significant species that are potentially affected by forest management activities and that have not been adequately accounted for through existing management strategies. While the biodiversity and riparian provisions of the Forest Practices Code are intended to provide for the needs of most wildlife species, some species that are considered to be at risk require special management practices. Volume One of the Province's Identified Wildlife Management Strategy (IWMS)—released in February 1999—provides mechanisms for managing critical habitat for identified wildlife species including Wildlife Habitat Areas (WHAs), General Wildlife Measures (GWMs) and higher level plan recommendations.

The Hamatla treaty Society and the Namgis First Nation indicated that migratory birds and fur-bearing animals are an important part of First Nations' cultural food sources and economic resource, noting that these animals are not accounted for in the identified wildlife category. As noted above, the biodiversity and riparian provisions of the Forest Practices Code are intended to provide for the needs of most wildlife species. The Identified Wildlife Management Strategy identifies the special habitat management necessary to ensure the survival of some species' populations across their natural ranges.

I am not aware of any migratory birds or fur-bearing animals that are not adequately accounted for under the current strategy. However, an updated version of the Identified Wildlife Management Strategy will be published in late 2003, and it may identify that require special management in the Johnstone Strait and Bonanza Lake MUs. Should additional species be identified, this will be accounted for in a future determination.

According to the document *Managing Identified Wildlife: Procedures and Measures, Volume 1*, identified wildlife potentially occurring within or adjacent to Johnstone Strait and Bonanza Lake MUs include the Tailed frog, Queen Charlotte goshawk, the Northern Goshawk, marbled murrelet and Keen's long-eared myotis. For the Moresby Island MU, these species include Queen Charlotte goshawk, sandhill crane, marbled murrelet, ancient murrelet, Cassin's auklet and Keen's long-eared myotis.

In general, identified wildlife species will be managed through establishment of wildlife habitat areas (WHAs) and implementation of general wildlife measures (GWMs), or through other management practices specified in higher level plans. No specific WHAs have yet been proposed in any of the MUs and as a result, no specific exclusions were applied in the base case on this account. The marine buffer in the Johnstone Strait MU (see *visually sensitive areas*) may address some of the nesting and perching requirements of bald eagles. As well, a 36-hectare ESA (EW2) has been is identified on West Thurlow Island to protect a known great-blue heron rookery and this area was excluded from the timber harvesting land base in the base case. Finally, as described above under *'environmentally sensitive areas'*, 135 hectares were excluded from the timber harvesting land base for marbled murrelet habitat in the Moresby Island MU.

Public input was received expressing concern that increasing the AAC as proposed will reduce the options for protecting species such as goshawks as nest-sites are identified. The licensee indicates it will identify goshawk nests and as an interim measure protect them with a 200-metre buffer.

I note that government has limited the impact of management for identified wildlife in the short term to a maximum of one percent of the harvest level for the province. Given the Province's commitment to implement the IWMS, I expect that WHAs will eventually be established on TFL 47. I find it likely that the licensee will, to the extent possible, incorporate WHAs into its planned retention of old growth and the marine buffer.

Having considered these factors and the land base exclusions that were applied in the base cases, I believe it is appropriate to assume that establishing WHAs, including managing for goshawks, will ultimately reduce timber supply by less than one percent relative to the base case projection, and I will discuss this further under '*Reasons for Decision*'.

I encourage the appropriate government and licensee staff to assess the need for WHAs and appropriate general wildlife measures. Completion of this process will bring greater certainty not only to operational planning, but also to the next AAC determination.

- biodiversity

Biodiversity is defined as the full range of living organisms, in all their forms and levels of organization, and includes the diversity of genes, species and ecosystems and the evolutionary and functional processes that link them. Under the Forest Practices Code,

biodiversity in a given management unit is assessed and managed at both the landscape and stand levels.

- landscape-level biodiversity

Achieving landscape-level biodiversity objectives involves maintaining forests with a variety of patch sizes, seral stages, and forest stand attributes and structures, across a variety of ecosystems and landscapes. A major consideration in managing for biodiversity at the landscape level is leaving sufficient and reasonably located patches of old-growth forests for species that are dependent on or are strongly associated with old-growth forests. Although some general forest management practices can broadly accommodate the needs of most ecosystems, more often a variety of practices is needed to represent the different natural disturbance patterns under which ecosystems have evolved.

The delineation and formal designation of 'landscape units' is a key component of a sub-regional biodiversity management strategy. A landscape unit is an area established by the district manager, generally up to 100 000 hectares in size, based on topographic or geographic features such as a watershed, or series of watersheds, to manage biodiversity and other forest resource values.

The 1996 Higher Level Plans: Policy and Procedures guide outlines three biodiversity emphasis options (BEOs)—lower, intermediate and higher—that may be employed when establishing biodiversity management objectives for a landscape unit. To achieve a balance between biodiversity and timber supply objectives, this guide recommends the application of a mix of BEOs in each subregional planning area. The proportions of a planning area subject to lower and intermediate biodiversity emphasis should range from 30 to 55 percent, with the average at approximately 45 percent of the area subject to lower, 45 percent to intermediate, and 10 percent to a higher BEO.

The *Biodiversity Guidebook,* the *Landscape Unit Planning Guide* and *Higher Level Plans: Policy and Procedures* all provide further policy and guidance on management for landscape-level biodiversity. The *Landscape Unit Planning Guide* provides guidance on which components of the full range of recommendations included in the *Biodiversity Guidebook* should be implemented to achieve a balance of forest management objectives. The *Landscape Unit Planning Guide* contains forest cover constraints for old seral forest that are recommended for application at the biogeoclimatic variant level within each landscape unit. The recommendations are stated as a minimum percentage of the productive forest to be retained in stands above a specified age that varies by ecosystem type. The guide also allows the old seral requirement to be phased in over time in landscape units with a lower biodiversity emphasis.

The Johnstone Strait MU falls within five draft LUs, each of which has been assigned a draft BEO in the Coast Forest Region's 'regional draft landscape unit planning strategy' (RLUPS). However, because the BEOs are still in draft form, the licensee used the recommended provincial distribution of 45-45-10 to calculate the percentage of area in each variant that will need to be retained in old seral forest in the long term.

For the base case, the licensee determined the percentage of the forested area within each LU, biogeoclimatic variant combination that currently meets the old-growth age criterion

for the variant. In the model, the licensee ensured that this percentage of old growth was maintained over the forecast period. In variants where insufficient old-growth area is currently available to satisfy the long-term target, younger stands in non-contributing areas aged in the model, and eventually the long-term targets were met in all LU, variant combinations.

Within the RLUPS, three LUs within the Johnstone Strait MU have been assigned a draft 'lower' BEO and two a draft 'intermediate' BEO. The licensee performed a sensitivity analysis to determine the impact on timber supply of applying the draft BEOs from the RLUPS for each LU. There was no change from the base case harvest forecast because the percent requirement of old seral forest calculated based on the provincial distribution of 45-45-10 is very similar to the percent requirement of the draft BEOs.

The *Vancouver Island Land Use Plan Higher Level Plan Order* (VILUP Order) was promulgated by government in 2000. It includes direction for SMZ 19, which covers part of the Quadra landscape unit. Under the Order, the target for mature seral forest (usually stands older than age 80 years) should range between 25 and 30 percent of the forested area of each SMZ. Also, where mature forest currently covers less area than the target range, the target amount must be in place within the next 50 years. The majority of the Johnstone Strait MU falling within SMZ 19 is within the CWHxm biogeoclimatic variant. Based on the analysis, the 25- to 30-percent target is projected to be met within the first decade of the base case forecast. Within the CWHmm1 biogeoclimatic variant, covering 463 hectares, or 0.4 percent of the timber harvesting land base of the Johnstone Strait MU, the target is projected to be achieved in about four decades.

The *Vancouver Island Summary Land Use Plan* includes a recommendation that the additional long-term reduction in timber supply resulting from practices in SMZ areas is not to exceed, in aggregate across all SMZ units, 10 percent over the impact associated with the normal Code stewardship provisions. The licensee used this percent impact estimate and calculated that the timber supply impacts associated with all the VILUP Order requirements for SMZ 19 will be in the order of 5500 cubic metres per year. Given the information in the preceding paragraph, I believe that the impacts on timber supply from managing for mature seral forest in SMZ 19 will likely be much less than the 5500 cubic metre total impact estimate. I will discuss other factors associated with the VILUP Order and their implications for timber supply below under '*Vancouver Island Land-Use Plan*'.

The Bonanza Lake MU falls entirely within the Bonanza LU. In the base case the licensee applied the same method described above for the Johnstone Strait MU to calculate the percentage of area in each variant that will need to be retained in old seral forest over time.

The licensee conducted a sensitivity analysis to examine the impact on timber supply of attempting to meet the 'intermediate' BEO target recommended in the RLUPS for the Bonanza LU as soon as possible. Timber supply was not affected compared to the base case. For this LU the percent requirement of old seral forest calculated based on the provincial distribution of 45-45-10 is also very similar to the percent requirement of the draft BEO.

Under the VILUP Order the Bonanza Lake MU falls within Enhanced Forestry Zone 11.

As I described above, the MU is also within a LU with an 'intermediate' BEO recommended in the RLUPS. Within Zone 11, to avoid severe social and economic consequences, as determined by the district manager and the designated environment official, the order allows the 'intermediate' BEO target of 13 percent for old-growth retention in the CWHvm1 variant to be reduced by up to one-third provided that ecologically suitable second-growth forest is identified to recruit the shortfall. The licensee did not account for this in the base case. I find this acceptable because no determination has yet been made to allow for a reduction in the old-growth requirement.

With the RLUPS and the VILUP having been finalized, and with the VILUP Order having been promulgated, I believe it is likely that when final landscape unit boundaries and BEOs are established, they will be little changed from the draft boundaries and BEOs. Given the results of the sensitivity analyses for Johnstone Strait and Bonanza Lake MUs, I consider it likely that the eventual establishment of BEOs in the area covered by these two MUs will not significantly alter the timber supply projected in the base case. Nevertheless, in view of public concerns expressed regarding biodiversity planning and old-growth management, particularly on Quadra Island, I encourage agency and licensee staff to work towards confirming the location of old-growth management areas before the next determination.

The Moresby Island MU falls within three LUs. However, the area overlapping the Sewell LU is only 21 hectares and therefore, for the purpose of the analysis, Teal Cedar assumed this area is included in the Skidegate Lake LU. The LUs and BEOs have not yet been established on the Queen Charlotte Islands. Therefore, in the base case Teal Cedar used the provincial distribution of 45-45-10 to calculate the percentage of area targeted for each variant to be retained in old seral forest during the first rotation. For the portion of the area assumed in the provincial distribution to be assigned a lower BEO, consistent with direction from the *Landscape Unit Planning Guide*, Teal Cedar targeted one-third of the total old seral forest requirement in the model. Old seral targets for each LU, variant combination were met throughout the base case harvest simulation.

Teal Cedar conducted a sensitivity analysis to examine the impact on timber supply of attempting to meet the BEO target for each LU recommended in the RLUPS. The base case forecast was not affected in the short- and medium-terms.

The retention silvicultural system currently practised by Teal Cedar on this MU will maintain old-growth characteristics on harvested stands. Despite the retention of many old-growth trees, once they are harvested in the model these stands are no longer considered old growth for the purpose of contributing to landscape-level old-growth requirements. In addition, as discussed below under 'operability', Teal Cedar is currently operating in areas classified for the base case as inoperable, and these areas were assumed to contribute to landscape-level biodiversity requirements in the base case.

I am aware that the chief forester requested in 1996 that the licensee prepare a biodiversity plan for the Moresby Island MU, and that this has not happened. I note, however, that the chief forester asked the licensee to first prepare a terms of reference for the anticipated plan, to be approval by the regional manager of the Coast Forest Region. With the then recent publication of the *Landscape Unit Planning Guide* and the expectation that old growth management areas (OGMAs) would be identified and

established within three years, in February 2000 the regional manager instructed the licensee that the Landscape Unit Planning Guide superseded any previous conditions in management plan approval letters regarding the preparation of biodiversity plans. Hence the licensee was not longer obliged to prepare the biodiversity plan.

I note that OGMAs have not yet been identified or established on the Moresby Island MU. I further observe that since the base case was prepared the practices that have changed on this MU, such as the use of the retention silvicultural system and the harvesting operations in areas previously thought to be inoperable, have increased the uncertainty that the provincially sanctioned landscape level biodiversity requirements are being maintained at the desired levels. I therefore request that Teal Cedar prepare a summary of the old growth available by LU and variant and that it use this information in its harvest planning to ensure old growth is maintained or recruited as recommended in the LU Planning Guide.

I have reviewed the information regarding landscape-level biodiversity as modelled in the base case forecasts for TFL 47. I am satisfied that the methods used are consistent with current provincial policy, but I am influenced by the uncertainty that is introduced because the base case does not accord with recently adopted harvesting practices in the Moresby Island MU. I am aware of the direction within the VILUP Order for managing for mature-plus-old seral stage constraints in SMZ 19 within the Johnstone Strait MU and I believe the impact on timber supply will be very small. I do not consider this to represent a significant risk to the overall timber supply for TFL 47, and have made no adjustments on this account. If the district manager and the designated environment official decide that the old seral requirement may be reduced in the Bonanza Lake MU, this can be accounted for in a future determination.

I am aware of First Nations' concerns about the conservation of biodiversity, and I will address those later under *'First Nations considerations'*.

- stand-level biodiversity

Stand-level biodiversity is managed by retaining reserves of mature timber, or wildlife tree patches (WTPs) within cutblocks and in adjacent non-contributing areas and other reserved areas to provide structural diversity and wildlife habitat. The *Landscape Unit Planning Guide* contains recommendations on retention rates considered necessary for the maintenance of stand-level biodiversity.

For the Johnstone Strait and the Bonanza Lake MUs, the licensee reviewed its current operations and estimated that the size of the timber harvesting land base is reduced by one and two percent respectively to satisfy stand-level biodiversity requirements. Therefore, in the base case, it excluded one percent from the Johnstone Strait MU, and two percent from the Bonanza Lake MU timber harvesting land base after all the other land base reductions were applied. District staff concur with the licensee's estimates.

Teal Cedar used Table 20(b) of the *Biodiversity Guidebook* and determined that six percent of a cutblock area is required as WTPs in the Moresby Island MU. In the base case it reduced the stand volumes projected in the yield tables by six percent to account for this requirement. However, Teal Cedar's approach does not account for non-contributing areas that may satisfy WTP requirements. The expectation cited in the

Biodiversity Guidebook is that on the coast 75 percent of WTPs will be located on other non-contributing areas.

In consideration of this information, I believe it likely that the volume projections for stands in the Moresby Island MU have been underestimated by 4 to 5 percent and as a result, the harvest levels projected in the base case for this MU represent an underestimate in timber supply of 4 to 5 percent, or approximately 5000 cubic metres per year.

In summary, I accept the estimates for WTP retention applied in the base case for the Johnstone Strait and Bonanza Lake MUs as the best available information. I also consider that the overall harvest forecast for TFL 47 has been underestimated by approximately 5000 cubic metres per year for the entire forecast period due to a probable overestimate in WTP requirements applied in the Moresby Island MU. I have accounted for this underestimate in *'Reasons for Decision.'*

I request that the licensee and Teal Cedar review the placement of WTPs in operations and ensure that current practice is appropriately reflected in the timber supply analysis for the next AAC determination.

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

Other information

For this determination, I accept without further discussion the information concerning the twenty-year plans prepared for the three MUs, subject to the following comments concerning the projected harvest profile.

- harvest profile

I have reviewed the information regarding the harvest profile on the Johnstone Strait and Bonanza Lake MUs and am satisfied that the assumptions in the analysis for this factor were appropriate. As a result, I will not discuss my considerations for these two MUs in detail in this rationale.

The Council of the Haida Nation raised a concern that the harvest level proposed for the Moresby Island MU is predicated on harvesting a significant portion of second growth, whereas the licensee is currently targeting old growth which is in short supply in this MU. The Haida have requested that I attribute a portion of the harvest to second growth.

The general assumption across the province is that the forest industry will migrate over time from reliance almost entirely on old-growth timber, to reliance primarily on second-growth timber. In most of the province, it will be many decades before that will occur, except for on the south coast, where harvesting has occurred for a hundred years and where growth rates are relatively high. On the south coast, the migration to harvesting second growth is already well underway. Indeed, most of the harvesting on the Johnstone Strait MU of TFL 47 is now second growth.

On the Moresby Island MU, harvesting has remained overwhelmingly limited to old-growth stands, despite the increasing proportion of second-growth timber that meet

the merchantability criteria described under *'minimum harvestable ages'*. The amount of available old-growth timber is relatively small, and although the volume of available second-growth timber is already substantial, there has been virtually no utilization of that stock in recent years.

Teal Cedar as said that it must harvest a mix of old growth and second growth to maintain economic operations. It has indicated that logging and stumpage costs for second growth are high, and that it is difficult to find a market for the logs. The company requested that I do not attribute a portion of the AAC to second growth, so that it retains flexibility to harvest second-growth stands when it is economically feasible to do so. I am aware that Teal Cedar is building a sawmill in Surrey, British Columbia, which is designed to process second-growth timber and which is expected to be operating very soon. With this mill, Teal Cedar hopes to market lumber sawn from second-growth timber from the Moresby Island MU and elsewhere.

The base case modelling assumptions about harvesting second growth on the Moresby Island MU are in stark contrast to the experience to date. The base case assumes harvesting of nearly 70 000 cubic metres of second-growth per year during the period 2000 – 2004. This figure drops to about 44 000 cubic metres per year during the next five-year period, and then rises to over 105 000 cubic metres per year beginning in 2010.

The first two and a half years of the base case forecast period have already passed, and no second-growth harvesting has actually occurred during that period. Indeed, district staff have advised me that only about 80 hectares of second growth has been harvested since 1996. I believe this calls into question the integrity of the assumed harvest profile, and of the timber supply as it is projected in the not-too-distant future.

Based on model output information provided with the licensee's timber supply analysis, BCFS staff determined that approximately 1.9 million cubic metres of available old growth existed on the derived timber harvesting land base of the Moresby Island MU in 2000, the first year of the forecast period. Under the 100-percent clearcutting regime and the initial harvest rate modelled in the base case, this volume would be fully depleted in 17 years, assuming no other constraints on timber harvesting. If all of the available old-growth stands were instead harvested according to Teal Cedar's new regime of 40-percent clearcutting, and 60-percent partial cutting with 40 percent of the volume being retained on average, the remaining available old-growth volume would support harvesting for only about 13 years. Again, I note that two and a half years have already passed relative to the starting date of the base case forecast.

This prospect of this rapid depletion of the remaining old-growth timber could be mitigated by harvesting old growth in some of the 4115 hectares classified as inoperable in the base case model. Although Teal Cedar has recently been harvesting in areas modelled as inoperable it is not clear to me whether this would significantly extend the 17-year or 10-year horizons, because no information has been provided to indicate how widespread logging will be in such areas. Nor has any information been provided to indicate the implications this will have for meeting old-growth retention targets across the landscape.

I certainly commend Teal Cedar for its recently adopted approach to managing for forest attributes that are important to the Haida, such as "monumental" cedar and medicinal

plants. However, it is apparent that any timber supply beyond the next decade will be very dependent upon harvesting second growth, as pointed out by the CHN and as inherent in the base case modelling. Indeed, unless the harvesting of second-growth timber is significantly "ramped up" in the next several years, timber supply will quickly "crash" to virtually nil. I will discuss this further under *'Reasons for Decision'*.

I have considered the available information concerning the harvest profile on the Moresby Island MU and I am concerned about the looming shortage of unconstrained old-growth timber. In effect, I am concerned about the lack of second-growth harvesting despite there being an ample supply of second-growth timber that meets the assumed minimum merchantability criteria in the base case. I will discuss this further under *'Reasons for Decision'*.

- harvest rules

Harvest rules are assumptions applied in the analysis to attempt to reflect the priority and order of stands harvested in current practices. For both the Johnstone Strait and Bonanza Lake MUs an oldest-first harvest rule—whereby harvesting priority is placed on the oldest stands—was applied. This harvest rule was also applied for the analysis for the Moresby Island MU, but in conjunction with a modelling rule intended to minimize loss of growth potential.

Licensee staff indicate that past harvesting patterns for the Johnstone Strait MU have left many small isolated patches of old-growth forest amongst immature stands. Operationally, these old-growth patches are not likely to be harvested until the immature stands reach a merchantable age. Therefore, in the short term the oldest-first harvest rule does not accurately reflect current practice in this MU.

Public input was received concerning the application of the 'oldest first' harvest rule in the Johnstone Strait MU. One person suggested that placing a harvest priority on the oldest stands now would negatively impact the ability to harvest stands at the age of culmination of mean annual increment (CMAI) in the future. Another person was opposed to concentrating the harvest in old growth in the short term because this will reduce the options for locating old growth management areas when old growth on the Johnstone Strait MU is already in short supply.

Regarding the public input for the Johnstone Strait MU, I note that the licensee is aware that the oldest first harvest rule applied in the base case does not well reflect current operations. BCFS district staff inform me that almost all the volume harvested in this MU is second growth and given that almost half of the timber harvesting land base is covered with 60 to 80 year old stands, I see no reason why this should not continue. I further note that in the base case, landscape-level biodiversity constraints were applied to ensure that during the forecast period old growth is maintained, or where necessary recruited, to meet the recommended targets in the *Landscape Unit Planning Guide*.

Having reviewed and discussed with BCFS staff the information concerning the harvest rules applied in the analysis, I conclude that the assumptions used are not an accurate reflection of the second-growth harvesting that actually occurs on the Johnstone Strait MU. However, on this factor alone I do not believe this discrepancy impairs the integrity of the base case projections.

- Vancouver Island Land Use Plan

The *Vancouver Island Land Use Plan* (VILUP) was announced by government in June 1994. The plan encompassed all of Vancouver Island, except Clayoquot Sound, and some adjacent islands, covering a total area of 3 349 011 hectares. The plan categorized 13 percent of the area as proposed protected areas, 24 percent as enhanced management zones, 31 percent as general management zones, and 7 percent as special management zones. The remainder is comprised of agricultural, settlement and private land areas.

Since 1994, a number of implementation actions have been taken including further clarifications of the plan's intent. The *Vancouver Island Summary Land Use Plan*, accepted by government in 2000, further clarified direction for resource management zones and other features of the plan. As mentioned earlier, the VILUP Order, specifying binding land-use objectives, was promulgated by government in December 2000. The key objectives of the VILUP Order that affect timber supply relate to requirements for green-up, cutblock size, visual resources and landscape unit planning.

As mentioned earlier, the VILUP Order established Crown land on Quadra Island as SMZ 19, covering approximately 9.9 percent of the timber harvesting land base of the Johnstone Strait MU. This SMZ is identified in the order as having primary visual resource values and the objectives for the area are to sustain ecosystem structure and function and to maintain visual quality. Specifically the objective is to maintain the visual quality of known scenic areas in accordance with the recommended visual quality classes in the visual landscape inventory, until the district manager establishes visual quality objectives for the areas. As noted above under '*visually sensitive areas*', the district manager has not yet established visual quality objectives and the licensee is managing the known visually sensitive areas in accordance with the VQCs in the landscape inventory, consistent with the SMZ objective.

The specific direction for SMZs in the VILUP Order, including SMZ 19, is to apply a variety of silvicultural systems, patch sizes and patch shapes across the zone, subject to a maximum cutblock size of 5 hectares if clearcut, clearcut-with-reserves or seed tree silvicultural systems are applied, and 40 hectares if shelterwood, selection or retention silvicultural systems are applied. The licensee did not include any specific accounting of this direction in the base case for the Johnstone Strait MU. It assumed that any timber supply impacts pertaining to this direction of the VILUP Order would be accounted for in its 10 percent (5500 cubic metre per year) impact estimate described above under '*landscape-level biodiversity*'. As explained in that section, I do not anticipate that the impacts will be that high.

The entire Bonanza Lake MU and the area outside SMZ 19 in the Johnstone Strait MU have been established under the VILUP Order as enhanced forestry zones. For these zones, the VILUP Order allows for cutblocks that are larger than the maximum 40 hectares established for the Coast in the Operational Planning Regulation (OPR). It also allows for green-up heights to be reduced from the minimum of 3 metres established in the OPR to a minimum of 1.3 metres, subject to determination by the forest district manager that relaxation of cutblock size or green-up constraints will not significantly impact specific hydrological, wildlife, biodiversity, scenic, or recreation values.

In considering the implications of the VILUP Order for timber supply on TFL 47, I am mindful that, as discussed above under *protected areas*, all protected areas recommended by the VISLUP and subsequently designated through order-in-council were excluded in the derivation of the timber harvesting land base. I am satisfied, as discussed above under *landscape-level biodiversity*, that the timber supply implications of managing for mature-plus-old timber in SMZ 19 will be small. I also do not expect the implementation of reduced cutblock block sizes in SMZ 19 to significantly reduce timber supply. The district managers have not yet provided direction allowing for reduced green-up height requirements in enhanced forestry zones. Given the available information, I therefore conclude that the implementation of the VILUP Order has been reasonably well accounted for in the base case. As experience is gained through the implementation of the VILUP Order, this experience can be reflected in future AAC determinations.

- Central Coast Land and Resource Management Plan

Portions of the Johnstone Strait MU are within the area covered by the CCLRMP process, which began in 1996. In April 2001, agreement was reached on the first phase of the CCLRMP. In November 2001, government endorsed the intent of the first phase agreement. It formed the CCLRMP completion table, which is expected to make its recommendations to government and the First Nations by December 2003. Following review by government and First Nations, the final plan is expected to be completed by March 2004.

The government-endorsed 2001 agreement states that the operating land base (areas outside parks) within the area covered by the CCLRMP will be managed under an Ecosystem Based Management (EBM) system. The Coast Information Team, a group of independent scientists, is currently developing management practices for this system. While the detailed management practices are not yet known, there is some indication that they will be more restrictive for timber harvesting than current practice.

I have discussed the implications for this determination of the proposed protection areas under *'protected areas'* and of the SMZs proposed under the CCLRMP under *'visually sensitive areas'* and I will not discuss these issues further here.

If any or all of the areas proposed for protection are indeed protected under the CCLRMP, and if the SMZs are established with greater restrictions on harvesting than was assumed in the base case, and if the practices under the EBM system are confirmed by government, this will be accounted for in the next AAC determination. For this determination I have made no adjustments on this account. I do note, however, that the AAC remains reduced for the duration of the "designated area" status of Hanson Island.

(b) the short and long-term implications to British Columbia of alternative rates of timber harvesting from the area,

Alternative rates of harvest

The nature of the transition from harvesting old-growth forests to harvesting second-growth forests is a major consideration in determining AACs in many parts of the province. In the short term, the presence of large timber volumes in older forests often

permits harvesting above long-term levels without jeopardizing future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that current and mid-term harvest levels will be compatible with a smooth transition toward the usually (but not always) lower long-term harvest level. Thus, timber supply should remain sufficiently stable so that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply, nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

The licensee provided no alternative harvest forecasts for the Johnstone Strait and Bonanza Lake MUs. However, Teal Cedar did prepare an alternative forecast for the Moresby Island MU. In this forecast the initial harvest level was maintained for the entire forecast period. This type of harvest forecast is often referred to as a flat-line harvest forecast.

I have reviewed the information provided and am aware that harvest forecasts are possible that differ from those presented in the base case for each MU, and for the next determination, I expect the licensee to provide me with alternative forecasts. Nevertheless, as described under timber supply analysis, I find the base case harvest forecast for each MU represents a generally reasonable projection of harvest flow, subject to the exceptions I have identified throughout this rationale.

As discussed under '*Timber supply analysis*', the licensee did not provide an aggregated harvest forecast for the entire TFL. I therefore asked BCFS staff to produce a summary of the forecasts for the three MUs and I have considered this summary forecast in my *'Reasons for Decision'*. For the next determination I expect the licensee to also provide the base case, alternative and sensitivity analysis harvest forecasts for the entire TFL.

- community dependence

As reported in Management Plan No.3, the licensee estimates that in the year 2000, 290 people were employed by TimberWest to harvest, mill and administer the timber supply from the Johnstone Strait and Bonanza Lake MUs. The milling and administrative jobs are principally located in Campbell River and Vancouver.

In 2000, TimberWest crews harvested 28 percent of the total harvest volume. TimberWest also employs contractors to harvest and transport logs to the water (full, or stump-to-dump contractors) as well as contractors who complete one or more of the phases of a harvesting operation (phase contractor). Including the Moresby Island MU, in 2000 I understand the full contractors accounted for 55 percent, and phase contractors 17 percent of the total harvest volume.

Contractors are also employed in forest management projects such as road deactivation, planting, brushing and weeding and juvenile spacing. Contractors have also been employed to conduct non-timber resource inventories such as recreation and visual landscape.

According to Management Plan No. 3 (Part B), in 2000, 131 jobs were related to the harvest on the Moresby Island MU. Seventy-eight people were employed on the Queen Charlotte Islands and the remaining 53 people in milling and administration.

I am aware that employment on TFL 47 is subject to some uncertainty, given the current downturn in the forest industry. Nevertheless, I recognize that the timber supply from TFL 47 contributes significantly to both provincial and community economies, and I have considered this information in my determination.

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

Timber processing facilities

In 2002, the total invoiced log production from the Johnstone Strait and Bonanza MUs was 625 600 cubic metres excluding residue and waste and 'Z-grade' logs. All timber harvested, with the exception of that consumed by TimberWest's Elk Falls Lumber Mill at Campbell River, was offered for sale or used to fulfil contractual fibre supply obligations.

The Elk Falls Lumber Mill consumed 217 200cubic metres, and the NorskeCanada mill near Campbell River, which produces newsprint, specialty papers, market pulp and containerboard, consumed 98 200 cubic metres. North West Hardwoods consumed 78 400 cubic metres of alder, and 9 500 cubic metres was sold to Jemico. Finally, 222 300 cubic metres were sold or traded.

For the Moresby Island MU, in 2001 the invoiced log production was 82 802 cubic metres, excluding waste. This volume was processed at the Teal Cedar mill in Surrey. This shake and shingle mill produces 72 000 cubic metres per year. The majority of the shingle-quality cedar produced comes from the Moresby Island MU.

Much of the hemlock sawlog and utility-grade material from the Moresby Island MU is milled at the Stag Timber mill in Surrey. This mill produces 420 000 cubic metres per year. Teal Cedar also sells logs on the open market in Vancouver and uses the timber harvested on Moresby Island to fulfil its contractual fibre supply obligations.

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia,

Economic and social objectives

- Minister's letter and memorandum

The Minister has expressed the economic and social objectives of the Crown for the province in two documents to the chief forester—a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996, (attached as Appendix 4). These economic and social objectives are important considerations in my determination of an AAC for TFL 47.

This letter and memorandum include objectives for forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest-level changes in a managed transition from harvesting old-growth to second-growth forests, so as to provide for community stability.

The Minister stated in his letter of July 28, 1994, that "any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability." He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. To encourage this the Minister suggested consideration of partitioned AACs.

I have considered the contents of the letter and memorandum in my determination of an AAC for TFL 47. I note that the licensee currently considers opportunities for commercial thinning to be limited on the TFL and has no plans to conduct this practice. However, as discussed earlier under '*deciduous forest types*', I have assumed a contribution from pure deciduous and deciduous-leading stands currently aged younger than 70 years.

The Minister's memorandum addressed the effects of visual resource management on timber supply. The Minister asked that pre-Code constraints applied in order to meet VQOs be re-examined when determining AACs in order to ensure they do not unreasonably restrict timber supply. Having reviewed the information regarding visual resources, I am satisfied that the constraints applied in the base case reflect the Minister's request and the current management considerations necessary to maintain the quality of the visual resource on TFL 47.

- local objectives

The Minister's letter of July 28, 1994, suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with government's broader objectives.

The licensee provided opportunity for public review at a number of stages in the process for Management Plan No. 3, including the draft statement of management objectives, options and procedures (SMOOP) and the draft management plan, through advertisement in local and regional newspapers, conducting open houses in various communities, and making the documents available for public viewing from various offices. I have reviewed the process used by the licensee to solicit public input and I am satisfied that it has met its obligations satisfactorily.

A significant amount of public comment was received. I have reviewed all the submitted information in summarised form, and some has been presented to me in detail. Wherever possible, I have attempted in the appropriate sections of this rationale to respond briefly to the views expressed, and consideration of this input has been an important component of my AAC determination.

One member of the public expressed the opinion that the AAC should not be increased, especially on Quadra Island. As described previously in this rationale, the initial harvest level projected for the TFL as a whole is greater than the current AAC, and I am mindful of the concerns expressed regarding Quadra Island. As noted under 'Guiding Principles for AAC Determinations', the AAC that I determine does not prescribe a particular plan of harvesting activity within a specific location on TFL 47, such as Quadra Island.

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

Abnormal infestations and salvage programs

Unsalvaged losses are timber volumes destroyed or damaged by agents such as fire, insects and disease that are not recovered through salvage operations.

The incidence of fire is low in all three MUs on TFL 47. Very little timber volume is lost to fire and therefore the licensee and Teal Cedar did not include any reduction for fire in their estimates of unsalvaged losses.

The incidence of insect and forest health related factors is also low on the Johnstone Strait and Bonanza Lake MUs. The licensee notes low infestation levels of the balsam woolly adelgid (*Adelges piceae*) in these MUs. Infestations are managed by targeting the affected stands for harvest and limiting the planting of balsam (Abies species) in areas expected to have a moderate to high risk of infestation. The hemlock sawfly (*Neodiprion tsugae*) has been detected in the Bonanza Lake MU. Any new, or expansion of existing infestations should be detected by the licensee through its ongoing reconnaissance program. Root diseases, in particular *Phellinus weirii*, *Armillaria ostoyae* and *Verticicladiella wagereri*, are also found in these MUs. The licensee plans to manage areas greater than 0.1 hectare in size infected by root disease within a cutblock by stumping treatments, and by planting tolerant or resistant species such as western redcedar, western white pine and red alder. The licensee estimates that unsalvaged losses resulting from insects and forest health problems are virtually nil.

According to Management Plan No. 3 (Part B), the western blackheaded budworm (*Acleris gloverana*) and the hemlock sawfly are serious pests in the Moresby Island MU. These defoliating insects reached epidemic levels in 1998, and remained high in 1999 and 2000. Tree top kill and mortality may occur as a result of heavy defoliation, especially if an outbreak continues over several years. The Canadian Forest Service's Pacific Forestry Centre has initiated a monitoring program to study the effects of the infestations.

For the analysis Teal Cedar assumed that the effects on yield of these insects is accounted for in the samples used to generate yield tables and in the operational adjustment factors (i.e., they assumed these are endemic losses).

Most unsalvaged losses in all three MUs are the result of windthrow that occurs in small pockets or on the exposed edges of cutblocks. For the Johnstone Strait and Bonanza Lake MUs the licensee estimates that these losses amount to approximately one percent of the annual volume harvested. In the base case forecasts, the one-percent estimate for unsalvaged losses was deducted from the total harvest levels across the forecast period. District staff agree with the estimate, but are concerned that the use of variable retention harvesting systems and the associated cutblock design may lead to increased losses to windthrow. They note that salvage is difficult due to the small volumes of timber involved, the rapid decline of hemlock wood quality once blown over, and the scattered distribution of the patches of windthrown timber.

Teal Cedar estimates that for the Moresby Island MU unsalvaged losses from windthrown timber amount to two percent of the volume harvested annually. District staff agree with this estimate.

I have considered the information about forest health concerns and unsalvaged losses on TFL 47. I note that the forest-health related problems are mostly endemic in nature. I am concerned that variable retention harvesting systems may increase losses from windthrow, however, I am aware that no information is currently available to quantify any additional impacts to timber supply resulting from the use of this silvicultural system. I am aware of the licensee's and Teal Cedar's commitment to continue monitoring the effects of all forest health issues on the TFL and look forward to any new data for the next timber supply review for TFL 47.

Overall, I accept the licensee's information and assumptions concerning abnormal infestations as the best available information and have made no adjustments on this account.

First Nations Considerations

- introduction

TFL 47 falls within the asserted traditional territories of several First Nations. On the Johnstone Strait MU, the We Wai Kai, We Wai Kum, Tlowitsis, Kwiakah, K'ómoks, Mamalilikula Que'qwa'sot Enox, Homalco and Klahoose First Nations have asserted traditional territory. The Namgis First Nation has asserted traditional territory on the Bonanza Lake MU, as has the Haida First Nation on the Moresby Island MU.

Several of these First Nations have formed groups to participate in the treaty process with the Province of British Columbia and the federal government. The Hamatla Treaty Society member bands are the Wei Wai Kai, Wei Wai Kum, Tlowitsis, Kwiakah and K'ómoks First Nations. This Society is now in stage four of the six-stage treaty negotiation process, negotiating an agreement in principle.

The Winalagalis Treaty Group includes five First Nations, and among them the Namgis First Nation. This group is currently also at stage four of the treaty negotiation process.

The Council of the Haida Nation includes the Old Massett Village Council and the Skidegate Band Council. While the Haida have not yet entered stage two of the treaty negotiation process, they, along with several other First Nations (the Gitga'at, Haisla, Heiltsuk, Kitasoo/Xaixais and Metlakatla Nations) and the provincial government, signed a General Protocol Agreement on Land Use and Interim Measures. On April 17, 2001 the Council of the Haida Nation and the government of British Columbia signed a Protocol on Interim Measures and Land Use Planning. On March 28, 2003 the provincial government and the Council of the Haida Nation signed a framework agreement to co-manage land use planning on Haida Gwaii (the Queen Charlotte Islands). The agreement is to co-develop a land-use plan that is ecosystem-based, protects the environment, maintains spiritual and cultural values and fosters community well-being while it opens up economic opportunities to all people of Haida Gwaii.

The Homalco and Klahoose First Nations are negotiating independently with Canada and British Columbia and are both currently at stage four of the treaty negotiation process, negotiating an agreement in principle. The Mamalilikula Que'qwa'sot Enox First Nation is currently not involved in the treaty negotiation process.

- consultation process

On July 8, 2002 the regional manager of the Coast Forest Region sent the First Nations with asserted traditional territory listed above, and the three First Nation groups mentioned above, a letter along with copies of the TFL 47 information package and timber supply analysis report. The regional manager invited the First Nations to review the documents and provide their related concerns to me for my consideration. He also invited the First Nations to contact Coast Forest Region staff if they wished to meet with appropriate government and industry representatives to discuss any concerns or questions they might have related to these documents.

Johnstone Strait MU

The Hamatla Treaty Society provided detailed written comments on the analysis for the Johnstone Strait MU. No other First Nations provided input for this MU. The Hamatla first presented its comments on August 15, 2002 at a meeting attended by Ministry of Forests and licensee staff. A further meeting was held on August 28, 2002 to discuss the technical details of the analysis. On February 10, 2003 TFL Forest Ltd. responded in detail to the Hamatla's very detailed comments. I have reviewed the both parties' comments and note that many of the issues raised by the Hamatla were related to the technical aspects of the analysis that I am required to consider in this AAC determination. I have reviewed these technical issues in detail with ministry staff, I believe I understand the uncertainties in the information and assumptions used, and the relevant implications for timber supply, as discussed in this rationale.

On April 16, 2003 I sent the Hamatla a letter indicating that the main purpose of the consultation process was to provide me with an understanding of the aboriginal interests the First Nations have in the area covered by the TFL. From the information provided by the Hamatla in its comments of August 15, 2003, I understand the Hamatla's interests include the following:

- The development of a long-term management strategy for western redcedar and yellow cedar for areas within TFL 47 overlapping the Hamatla member nations' asserted traditional territories.

  In this regard I am aware of the Hamatla's expressed desire to protect currently existing old-growth stands containing red- and yellow cedar until replacement cedar stands have matured to express certain quality characteristics.

- A general concern regarding the level of biological diversity being maintained on TFL 47 and the effects this has on the Hamatla's access to timber and non-timber resources of certain quality.

- Maintenance of medicinal and food plants, and wildlife and fish in the area of interest.

- An assertion that dense hemlock regeneration "prevents the regeneration of other plants, such as herbs and shrubs that are the basis for habitat for animals and birds." The Hamatla further indicate that this has impacted the Hamatla's access to wildlife, botanical and timber products necessary to their culture.

- Protecting cultural heritage resources such as culturally modified trees and village sites.

Bonanza Lake MU

The Namgis First Nation provided detailed written comments on the analysis for the Bonanza Lake MU. The Hamatla Treaty Society's comments described above were also directed at the Bonanza Lake MU. The issues raised by both the Hamatla and the Namgis were very similar. No other First Nations provided input for this MU.

The Namgis first presented its comments on September 13, 2002 at a meeting attended by Ministry of Forests and licensee staff. The Namgis then sent a letter to Coast Forest Region staff on September 17, 2002 indicating that in its view, it had not been consulted on TFL Forest Ltd.'s Management Plan No. 3 for TFL 47 (Part A). In addition, the Namgis contended that the proposed harvest level for the Bonanza Lake MU was too high because in its view, the management plan ignores the Namgis' forest resource needs for both plants and animals, it fails to incorporate a long-term management strategy for red- and yellow cedar and it pays insufficient attention to biodiversity across the landscape.

On October 4, 2002 Coast Forest Region staff wrote to the Namgis detailing the consultation efforts that had been undertaken by TFL Forest Ltd. to consult with the Namgis regarding Management Plan No. 3. Based on the steps taken by the licensee to consult with the Namgis, it appears the process was completed in accordance with the standards of the day.

On October 8, 2002 the Namgis reiterated its concern over the management plan review process, arguing that it was unreasonable to expect the Namgis to provide meaningful comment on a document that it could not review in its own offices on its own time. It also reiterated some of the points that were covered in the original submission on September 13, 2002.

On October 28, 2002, at a meeting with Port McNeill Forest District staff, the Namgis provided the BCFS with its Cedar Strategy Plan. The plan provides details on the kind of red- and yellow cedar that is needed, and the site factors necessary for growing trees that are suitable for cultural purposes. The plan is a first cut of a cedar management plan that will be developed by the Namgis.

On February 17, 2003 TFL Forest Ltd. responded in detail to the Namgis' written comments. I have reviewed the Namgis' comments and the licensee's responses and note that many of the issues raised by the Namgis were related to the technical aspects of the analysis. As discussed above, I am satisfied that I understand the technical issues related to this determination.

On May 9, 2003 I sent the Namgis a letter similar to the one I had sent to the Hamatla. From the information provided by the Namgis, I believe its interests include the following:

- Access on TFL 47 to red- and yellow cedar for carving and bark stripping now and in the future.

  I am aware of the contents of the Namgis' Cedar Strategy Plan and its proposal to

set aside old-growth red- and yellow cedar stands as cultural reserves until a long-term planning strategy for red- and yellow cedar is in effect in this management unit.

- An assertion that dense hemlock stands "prevent the regeneration of other plants, such as herbs and shrubs that are the basis for habitat for animals and birds."
- The level of biological diversity on TFL 47.

  I understand that the Namgis' believe biodiversity needs to be increased in this area to maintain First Nations' access to medicinal and food plants and to wildlife and fish.
- Recruiting old growth to maintain habitat for animal and plant species that are important to the Namgis.
- Protecting cultural heritage resources such as culturally modified trees and village sites.

Moresby Island MU

The president of the Council of the Haida Nation (CHN) first commented on the AAC determination process during a telephone conference with BCFS staff, the regional manager of the Coast Forest Region, and me. Subsequently I met with the CHN and BCFS staff in the CHN office in Skidegate on December 5, 2002. We discussed the status of Government Creek (a drainage within the Moresby Island MU identified by the CHN as a Haida Declared Protected Area), the proposed harvest level, the second-growth component of the harvest forecast, cedar needs, and the licensee's intention to transfer rights on the Moresby Island MU to Teal Cedar.

On January 29, 2003, the CHN sent me a letter containing its preliminary review of the analysis for the Moresby Island MU. The letter detailed the CHN's concerns regarding Management Plan No. 3 (Part B) and the timber supply analysis relative to its objectives for forest management. The CHN's specific objectives were said to include:

- Protecting cultural values, resources and sites, including intact lands and other sources of cedar for present and future use as monumental art, architecture and utility; sources of plants for CHN uses; and archaeological sites, culturally modified trees and other culturally significant sites.

  Concerning this objective, the CHN considers the 167-hectare provision for culturally modified trees completely inadequate to protect culturally important sites (including the Louise Dover Memorial Trail) or the Haida Declared Protected Area in Government Creek, and inadequate to provide cedar for present and future cultural use.
- Protecting fish habitat and water quality by protecting riparian areas and unstable slopes in order to maintain the natural physical processes in watersheds within the range of natural variability.

  The CHN commented that wider reserves are needed along the Copper River to restore old-growth forest in the riparian area of this important food-fishing river. It is generally concerned about the level of reductions applied in the analysis for

riparian areas. It is also concerned about harvest blocks being delineated on the twenty-year plan in areas classified as terrain class V and about the rate of cut in the Deena River watershed.

- Conserving all native species and their habitats and maintaining the diversity of species (biodiversity) within their historic ranges of variability.

  The CHN expressed concern that the current forest development plan proposes harvest blocks in areas identified by the CHN as being important for marbled murrelet and goshawks. In addition, it commented that Management Plan No. 3 (Part B) lacks a strategy for managing for future black bear denning habitat. It also noted the chief forester's requirement in the last AAC determination for TFL 47 of a strategy for managing the remaining old growth on TFL 47 and the lack of a reference to this requirement in Management Plan No. 3 (Part B). Finally, the CHN asserted that the 169-hectare environmentally sensitive area excluded for wildlife, and the six percent reduction for wildlife tree patches, are inadequate.

- Planning and maintaining scenic and recreational features.

  The CHN noted that the twenty-year plan includes cutblocks located along Skidegate Narrows and around Gray Bay using the conventional clearcut silvicultural system and that no provision is made for the fishing corridors along the Copper and Deena Rivers.

- Providing opportunities and access to economic activities for Haida and local people.

  The CHN noted the lack of recognition of the mushroom harvest taking place on the Moresby Island MU and the potential need to change management practices in second growth to sustain this activity.

- Restoring degraded forest sites and ecosystems to formative potentials.

  The CHN commented that Management Plan No. 3 (Part B) contains no plan to restore degraded hillsides or in-stream habitats. It further asserted that some second-growth stands must be allowed to grow old to provide representation, old-growth habitats, functioning riparian areas and connectivity.

- Using responsible logging systems that focus on what to retain rather than what to remove from the forest.

  The CHN commented that the partial harvest system recently instituted on the Moresby Island MU is not reflected in the analysis. This is a significant issue, which I addressed above under *'harvest profile'*.

On February 11, 2003 the CHN met with BCFS staff to discuss the issues raised in the letter of January 29, 2002. On the following day I joined the meeting to discuss the amount of old growth remaining on the Moresby Island MU, watersheds and concerns about the decline in sockeye salmon stocks, culturally modified trees, the biodiversity plan the chief forester requested in the 1996 AAC determination, second-growth harvesting and the CHN's request that I attribute a portion of the AAC to harvesting second growth on the Moresby Island MU, monumental cedar and cedar management, and Haida Declared Protected Areas.

On February 13, 2003 I toured virtually the entire Moresby Island MU by helicopter with Teal Cedar and CHN staff. On the ground we viewed areas that were being harvested using the retention silviculture system that Teal Cedar has been using since 2002. We also examined second-growth timber in which roads had been built to facilitate harvesting in the near future.

On March 14, 2003 the CHN sent me its Spatial Mapping Assessment for the AAC Determination for Moresby Block, TFL 47. In this assessment the CHN reiterated its concerns raised in previous meetings and correspondence and provided a plan which, in its view, addresses CHN's asserted deficiencies in the Teal Cedar plans. Included in the CHN plan are 24 old-growth reserves, reservation of 213 hectares of old-growth remnants and 17 second-growth reserves. The reserves were delineated in areas of high volume of cedar stands or known areas of cultural cedar, areas with known high densities of culturally modified trees (CMT), other culturally significant sites like the Louise Dover Trail, areas the CHN assert need watershed and riparian protection for salmon habitat, areas with known use by red-listed species such as goshawk and marbled murrelet, remaining old forest in riparian areas and fisheries sensitive areas, shoreline forests and unstable classV terrain.

The CHN Assessment is summarized in the following quotations from its March 14th document:

- *Remove Government Creek from the timber harvesting land base and from the AAC calculation.*
- *The AAC for the Moresby block of TFL 47 needs to be reduced significantly from the projected 112 000 cubic metres per year.*
- *The cut needs to be partitioned, so that at least 70 percent of the annual volume comes from second growth.*
- *The cut allocated to old growth needs to respect the old-growth values identified and protected in the CHNs mapped reserves.*
- *Establish at least a five-year moratorium on logging within the Deena Creek watershed to help it recover.*

On April 23, 2003 the CHN presented its spatial mapping assessment to BCFS Forest Analysis Branch and Queen Charlotte Islands Forest District staff, which I acknowledged on May 9, 2003.

Teal Cedar reviewed the CHN's assessment and requested I meet with it so it could present its position on the assertions and plans submitted by the CHN. That meeting occurred on June 10, 2003, at which time Teal Cedar provided me with a letter detailing its position on the CHN assessment. It indicated that in its management plan it commits to review all operational plans with the CHN and integrate known archaeological sites, including CMTs, into the planning process to protect cultural values and ensure there are resources available to maintain the Haida culture.

Teal Cedar also indicated that it will operate in a manner that will maintain the productive capacity of fish streams and marine areas. It will integrate fish and wildlife habitat needs into operational plans to maintain species and their habitats, and it will

integrate recreation resources into operational plans and manage known scenic areas for visual quality. It further indicated it will provide local, including Haida, employment. It will manage both lands and forest resources according to sound forest management and environmental protection principles and minimize impacts on non-timber resource values. Finally it commits to utilizing alternate silviculture systems where special measures are required to accommodate harvesting constraints. Teal Cedar then described its operational practices relative to the assertions made by the Haida, and I will discuss these below under *'considerations'*.

- considerations

cedar

I am aware of the First Nations' concern over the amount of "monumental" cedar needed for carving, and the availability of younger cedar stands for bark stripping. I am also aware that both red- and yellow cedar are used by First Nations for various cultural practices. I have reviewed the information concerning the First Nations' desire to have a cedar management strategy that will ensure that suitable cedar is available to them now and in the future. I note that Management Plan No. 3 does not contain such a strategy. Since the management plan was approved, the licensee has sent me a letter indicating that it will work with First Nations that have asserted cultural rights regarding cedar on the Johnstone Strait and Bonanza Lake MUs to identify the cultural needs and then to develop a strategy whereby the TFL lands can contribute towards meeting those needs. In fact I expect the licensee and the First Nations to initiate this process soon in respect of all three MUs. I will be expecting the next Management Plan to include that strategy, and that it will be reflected in the timber supply analysis for the next AAC determination.

I note that Teal Cedar has been successful at regenerating cedar in its plantations on the Moresby Island MU, and its current use of the retention silvicultural system ensures that some monumental cedar will be available for First Nations for at least one rotation. Nevertheless, I strongly encourage Teal Cedar to work with the licensee and the CHN in developing the cedar management strategy.

For this determination I expect that as long as cedar is being regenerated on TFL 47, suitable trees for bark stripping will be available and this practice is unlikely to impact timber supply. Conversely, I expect that managing for a sustained supply of "monumental" cedar, particularly to the extent that may involve very long rotation periods in some areas, will have a downward influence on long-term timber supply compared to the base case. However, no information is currently available to quantify the area that currently contains suitable "monumental" cedar trees, nor the amount of this type of timber that is necessary to sustain the First Nations cultural practices, nor the amount of area needed to recruit an adequate supply of "monumental" cedar trees. It is also not known to what extent these cultural needs can be met from the non-contributing land base or areas where harvesting is constrained due to visual sensitivity. Therefore the magnitude of a possible overestimate in timber supply on this account is currently unknown. I will discuss this further under *'Reasons for Decision'*.

biodiversity

I am aware of the First Nations' concerns regarding the maintenance of biodiversity on

the three MUs and their assertion that the modelled levels of old-growth retention are inadequate to protect resources that are important to First Nations, such as medicinal plants and animals.

I note that on the Johnstone Strait MU relatively little old growth remains; however I also note that almost no harvesting of old growth currently takes place on this MU. In my view, no matter what biodiversity management strategy is eventually applied on this MU, a recruitment strategy for old growth will be an integral component of its management.

I am aware of the agreements made between the CHN and the provincial government that forest management on the Queen Charlotte Islands will be ecosystem based and that the Haida Nation and the provincial government will co-manage land use planning on Haida Gwaii/Queen Charlotte Islands. I have reviewed the old- and second-growth reserves proposed by the CHN in its Spatial Mapping Assessment for the AAC Determination for Moresby Block, TFL 47, to protect the limited supply of old growth on the Moresby Island MU and the benefits it conveys to land-based and aquatic ecosystems. I appreciate the work that went into the plan and I expect it will form the basis for the land-use plan that government and the Haida will co-operatively prepare over the next few years. However, no decisions respecting land use have yet been made and I cannot prejudge what the outcome will be of this planning process. Nevertheless, given that the Haida are equal partners in this process and their conviction that reserves of this magnitude are necessary, I believe that if anything, timber availability is likely to be reduced on this account by an unknown amount over the forecast period. I will discuss this further under '*Reasons for Decision*'.

Regarding biodiversity management on the other two MUs and the ecosystem-based management that will eventually be practised on the Moresby Island MU, no information is currently available that details how the First Nation's biodiversity management strategy or ecosystem-based management differs from the provincially-sanctioned biodiversity management strategy modelled in the base cases for each of the three MUs. Until information is available that clarifies the management practices needed to satisfy the First Nations concerns and ecosystem-based management, I accept the biodiversity assumptions modelled in the base case as the best available information, subject to my additional considerations respecting landscape-level biodiversity discussed earlier under *'landscape-level biodiversity'*.

Deena Creek Watershed

The CHN have expressed concern over the condition of the Deena Creek Watershed on the Moresby Island MU and have requested a five-year moratorium on harvesting in that area. The watershed has been the subject of a Coastal Watershed Assessment Procedure (CWAP) and was found to be heavily impacted by forest operations, especially during the 1970s and early 1980s. According to the assessment the watershed has been recovering since then. The main concern noted is sediment loading in tributaries and the main stem from landslides and other road-related sources. However, road deactivation efforts have been significant between 1995 and 2000. The assessment concluded that there would be increased sedimentation, primarily due to road construction associated with the development planned from 2000 to 2004. It therefore recommended that future operations minimize roading, that planned development in South Fork sub-basin be

deferred, and that site-specific road re-activation requirements be developed. Teal Cedar has designated an environmental monitor who assesses the watershed on a day-to-day basis and has instituted a wet-weather shutdown procedure aimed at avoiding sediment delivery.

I note that in the context of an AAC determination, a five-year moratorium on harvesting in one watershed has little, if any, effect on timber supply. Rather any moratorium would be a significant feature of operational planning and site-specific harvest approvals. As discussed under *'Guiding Principles'*, the AAC I determine does not prescribe a particular plan of harvesting activity. Nevertheless, I fully expect any operations that are approved in the Deena River Watershed will be designed and conducted in accordance with the findings of the CWAP.

medicinal food plants and wildlife and fish

No information was provided detailing the management strategies needed to maintain these resources at levels that would satisfy First Nations needs. I note that wildlife and fish are protected under the general provisions of the Forest Practices Code and I have accounted for this under 'wildlife' and 'riparian resources' above. In addition, the management strategies detailed in the Landscape Unit Planning Guide are intended to provide suitable habitat for all native species. I note that no information is available that describes the practices necessary to provide an adequate supply of medicinal food plants important to the First Nations' culture. Until such information is available I consider the measures detailed in the Guide and modelled in the base case as reasonable for the protection of these resources. I further note that on the Moresby Island MU the use of the retention silvicultural system should ensure that a supply of medicinal plants will be available in harvested areas for at least one rotation. I encourage the First Nations to review operational plans and when areas important to their needs are proposed for harvest, to work with the licensee or Teal Cedar and the statutory decision maker to ensure a suitable harvest plan is prepared.

dense hemlock regeneration

I have considered the concern expressed by the Hamatla Treaty Society and the Namgis First Nation regarding the effect on herbs, shrubs and animals of dense regenerating forests. I have not been provided with any information detailing the densities of stands that would encourage the growth of the herbs, shrubs and animals that are important to First Nations' culture. Nor do I have any information describing the amount of area that would need to be managed at lower stand densities to satisfy the First Nations' needs for these resources. I encourage First Nations to work with the licensee at the operational-plan level to develop management strategies that will enhance the growth of the important herbs and shrubs.

In considering the effects on timber supply of managing to lower densities I note that timber yields decline significantly when stand density is reduced to below approximately 800 or 1000 stems per hectare. The licensee is establishing stands at densities around 1200 stems per hectare. I therefore believe that managing some areas to enhance the growth of shrubs and herbs will not significantly reduce timber supply. When suitable management strategies are in place, I can account for them in a future determination.

cultural heritage sites

I have discussed this factor earlier under *'cultural heritage resources'* and will not discuss it further here.

Government Creek

Since the early 1980's, a total of fourteen areas on the Queen Charlotte Islands have been identified by the CHN as "Haida declared protected areas". The Haida consider these areas to be significant for cultural, spiritual and environmental reasons. The Province has not yet made a land-use decision for these areas which would preclude timber harvesting activities, with one exception. The exception has been the Province's exercise of authority under Part 13 of the *Forest Act* to make a "designated area" of the Duu Guusd area within the Queen Charlotte TSA, thereby enabling the chief forester to make a temporary AAC reduction for the TSA to account for the current curtailment of harvesting activities in the Duu Guusd area.

The Government Creek watershed, one of the fourteen "Haida declared protected areas", is located on the Moresby Island MU. It covers a total of 1770 hectares of which 558 hectares are considered to be part of the timber harvesting land base in the base case for this MU. No timber harvesting has taken place in this watershed since 1994. The licensee undertook a sensitivity analysis by removing Government Creek entirely from the timber harvesting land base, causing timber supply to drop by about 4 000 cubic metres per year.

I am aware of the importance of this area to the Haida. However, I also note that until government makes a formal land-use decision for this area, I have no firm basis for assuming the area will not contribute to the timber supply for this MU in the long term. Nevertheless, given the importance of this area to the Haida, I expect that if harvesting does eventually proceed in Government Creek, the harvesting "footprint" will be less than would normally be the case. I therefore believe that on this account the timber supply has been overestimated by an unknown amount in the base case over the forecast period and I will discuss this further under '*Reasons for Decision*'.

Recognizing the importance of this issue, I strongly encourage the appropriate parties to actively pursue resolution of this issue so that the operational and timber supply uncertainties will be eliminated.

attribution of a portion of the AAC to harvesting second growth

I have discussed this factor in detail above under *'harvest profile'* and will not discuss it further here.

Reasons for Decision

I have considered the information discussed throughout this document, and I have reasoned as follows.

Taking into account the exceptions I have mentioned throughout this rationale, I accept that the base case forecast provided for each of the three MUs for TFL 47, and the aggregate of these forecasts prepared by BCFS staff, form a reasonable basis for assessing timber supply for this determination. Because the AAC I determine is for

TFL 47 in its entirety, I place particular emphasis on the aggregate forecast when considering potential implications for timber supply resulting from uncertainty in data and assumptions used in the base case for each MU.

In determining this AAC, I have identified factors which, considered separately, indicate that the timber supply may be either greater or less than that projected in the base case forecasts. Generally some of these factors can be quantified and their impacts assessed with some reliability. Others may influence timber supply by adding an element of risk or uncertainty to the decision but cannot be reliably quantified at this time. These latter factors are accounted for in AAC determinations in more general terms.

In this rationale, I have identified several factors for which I believe the base case assumptions differ from current operational practices or conditions. These factors are summarized below.

I have identified four factors that I believe may have caused timber supply to be underestimated in the base case projection:

- *site productivity estimates* — The use of inventory site indices in the base case for the Bonanza Lake MU may have caused the long-term timber supply to be underestimated by approximately 10 000 cubic metres per year. For the Moresby Island MU, use of inventory site indices may have caused short-term timber supply to be underestimated by about 3000 cubic metres per year, and long-term timber supply by about 13 000 cubic metres per year;
- *Moresby Island MU operability* — I am aware that Teal Cedar is harvesting areas that were assumed in the base case to be inoperable. I note that there is considerable uncertainty how much of the total of 4115 hectares currently classified as inoperable is in fact available for harvest. In the base case, 831 hectares of that were netted out of the timber harvesting land base for other reasons. I conclude that the timber harvesting land base in the Moresby Island MU was underestimated in the base case by an unknown amount on this account.
- *select seed* — Accounting for the current practice of using select seed on the Moresby Island MU would increase the long-term timber supply by an unquantified small amount.
- *stand-level biodiversity* — For the Moresby Island MU, I believe that, after accounting for various other retention provisions, less area will have to be retained for wildlife trees patches that was modelled in the base case. On this account, I conclude that timber supply may have been underestimated by approximately 5000 cubic metres per year over the forecast period.

For this determination, I have identified several factors that believe may have caused timber supply to be overestimated in the base case projection:

- *BC Timber Sales area deletion* — I conclude that deletion of area from the TFL in order to remove the BC Timber Sales operations, has had the effect of reducing timber supply by about 27 000 cubic metres per year relative to the base case. I attribute 24 500 cubic metres of this impact to the Johnstone Strait MU, and 2500 cubic metres per year to the Moresby Island MU.

- *cedar* — I expect that the licensee will begin to more explicitly manage the TFL to maintain a supply of "monumental" trees and other cedar for First Nations cultural use. This may reduce timber supply compared to the base case by an unknown, likely small, amount.
- *Moresby Island land-use planning* — In March, 2003, the Province committed to joint land-use planning with the Haida Nation. Given the Haida's conviction that significant old- and second-growth reserves are necessary, I anticipate that timber supply will be somewhat more restricted than was assumed in the base case. The potential impact of this change is unknown at this time.
- *Government Creek* — Given the importance of this area to the Haida, and given the Province's commitment to joint land-use planning, I conclude that if harvesting does proceed in Government Creek, the industrial "footprint" will be less than would occur under normal conditions. I therefore believe that on this account the timber supply has been overestimated by an unknown amount in the base case over the forecast period. I note that a sensitivity analysis indicated that complete removal of Government Creek from the timber harvesting land base would reduce timber supply by about 4000 cubic metres per year.
- *deciduous stands*— For the Johnstone Strait MU, I believe the area of pure alder and alder-leading stands currently contributing to timber supply has been overestimated by about 2000 hectares. For the Bonanza Lake MU, the contribution to the timber harvesting land base of alder and alder-leading stands has been overestimated by about 200 hectares and for the Moresby Island MU by about 350 hectares. I concluded this represents an over-estimation in the timber supply projected in the base case for TFL 47 as a whole of up to 15 000 cubic metres per year.
- *silvicultural systems/harvest profile* — I conclude that the use of the Variable Retention silvicultural system on the Johnstone Strait and Bonanza Lake MU probably will reduce timber supply compared to the base cases for those MUs by at least 10 500 cubic metres per year, and 3500 cubic metres per year respectively.

  For the Moresby Island MU, I commend Teal Cedar for its adoption of the retention silvicultural system in order to conserve substantial old-growth attributes in the areas it harvests. However I am aware that this harvesting method likely will cause reduced growth of regenerated trees, and will bring forward the time when harvesting will have to be mostly directed at second-growth timber.
- *VILUP* — The *Vancouver Island Land Use Plan Higher Level Plan Order* established Quadra Island as a Special Management Zone with certain constraints described earlier in this rationale. Although government specified that timber supply impacts should not exceed 10 percent, I believe the actual impacts on TFL 47 timber supply will be much less than that.
- *identified wildlife management strategy* — The base case properly made no provision for Wildlife Habitat Areas because none have been established. However, it is almost certain that some will be. I therefore conclude that timber supply was overestimated in the base case on this account by less than one percent.

My conclusions by Management Unit are as follows.

Johnstone Strait MU

The short-term timber supply projected in the base case was 559 350 cubic metres per year. I conclude that this is too high:

- by about 24 500 cubic metres because of the deletion of the BC Timber Sales area that occurred after the timber supply analysis was done;
- by about 12 000 cubic metres because of the inclusion of certain deciduous stands for which there is no evidence of harvesting performance;
- by at least 10 500 cubic metres because of the impact of adopting Variable Retention harvesting;
- by perhaps one-percent (or 5300 cubic metres) because no provision has been made for the likely establishment of Wildlife Habitat Areas;

  In most timber supply analyses, the prospect of establishing WHAs is relevant only to mid- and long-term timber supply. In this case, however, the Johnstone Strait base case projects a "flat line" timber supply, implying that this factor may be relevant as well to short-term timber supply.
- by an unknown small amount because of constraints introduced for Quadra Island by the *Vancouver Island Land Use Plan Higher Level Plan Order*; and
- by an unknown amount because of the need to conserve cedar for First Nations' cultural uses.

In total then, and based on the flat-line base case simulation, I conclude that the short-term timber supply in the Johnstone Strait MU is more appropriately no greater than about 507 000 cubic metres per year before allowing for impacts of the VILUP Order on Quadra Island, increased conservation of cedar, and uncertainty in the analysis assumptions.

I note that any flat-line projection of timber supply is profoundly influenced by the point in time when timber supply is most constraining. In the current modelling of this management unit, the "pinch point" that controls the flat-line projection appears to be in 15 to 20 years' time, which is relatively soon.

Bonanza Lake MU

The short-term timber supply projected in the base case was 188 100 cubic metres per year. I conclude that this is too high:

- by about 1000 cubic metres because of the inclusion of certain deciduous stands for which there is no evidence of harvesting performance;
- by at least 3500 cubic metres because of the impact of adopting Variable Retention harvesting; and
- by an unknown amount because of the need to conserve cedar for First Nations' cultural uses.

In total then, I conclude that the short-term timber supply in the Bonanza Lake MU is more appropriately no greater than about 184 000 cubic metres per year before allowing

for increased conservation of cedar, the long-term impacts of establishing Wildlife Habitat Areas, and uncertainty in the analysis assumptions.

In any case, it is very likely that timber supply will diminish in the coming decades.

Moresby Island MU

The short-term timber supply projected in the base case was 109 760 cubic metres per year. I conclude that this is too low by:

- about 5 000 cubic metres because of how retention of wildlife tree patches was modelled; and
- an unknown amount because some of the area assumed to be inoperable is in fact being harvested.

The modelled timber supply would also be too low by an unknown amount if the inventory-based site indices underestimate site productivity, as has typically been the case in other management units. If the provincial SIBEC estimates are more accurate, timber supply has been underestimated by about 3000 cubic metres in the mid- and long-term. Without detailed analysis, one cannot say whether this impact would exist in relation to short-term supply, all else remaining constant.

Conversely, I conclude that the short-term timber supply projected in the base case is too high by:

- about 2500 cubic metres because of the deletion of the BC Timber Sales area that occurred after the timber supply analysis was done;
- about 2000 cubic metres because of the inclusion of deciduous types for which there is no evidence of harvesting performance;
- an unknown amount because of the fact that the Province has committed to joint land-use planning with the Haida Nation, which is known to strongly advocate greater conservation than is the provincial norm, particularly in Government Creek; and
- an unknown amount because of the need to conserve cedar for First Nations' cultural uses.

These conclusions indicate that the short-term timber supply in the Moresby Island MU is more appropriately no greater than about 110 000 cubic metres per year before allowing for possible impacts of establishing Wildlife Habitat Areas, increased conservation of cedar, and the impact of the Haida Nation joining the Province in land-use planning.

It is important to note that above summary is based on a base case which assumes that 51 percent of the harvest in the period from 2000 through 2010 will be in second-growth stands. It also assumes that old-growth harvesting is all by way of clearcutting.

If second-growth timber were to be entirely avoided, and clearcutting were employed as modelled in the base case, BCFS calculations indicate that all of the remaining unconstrained old growth would be depleted in about 17 years. That period would be reduced to about 13 years if Teal Cedar's current harvesting regime (i.e., 40 percent clearcutting, and 60 percent partial cutting with 40 percent of the initial stand being retained on average) were employed. With no harvesting of second-growth having occurred in recent years, and with Teal Cedar having broadly adopted a partial-cutting

regime, this causes me to take a cautious approach to determining the AAC, all else being equal and despite the projection of significantly increasing supply of second-growth in the long term.

In the previous AAC determination, the chief forester attributed 100 000 cubic metres of the AAC to the Moresby Island MU. The actual rate of harvest has averaged about 81 000 cubic metres per year. I am comfortable that future timber supply in this Management Unit is in fact robust, provided that the rising supply of second growth timber is utilized. However, given the relatively small amount of remaining unconstrained old-growth timber, and given the great uncertainty about whether second-growth harvesting will indeed begin in earnest, I am loathe to increase the current sanctioned harvest rate on the Moresby Island Management Unit at this time.

Furthermore, I am concerned about the continuing avoidance of any second-growth harvesting, given that the base case is predicated upon such timber contributing half of the modelled timber supply in the first decade. I therefore conclude that it is appropriate to specify that a significant portion of the new AAC is attributed to second-growth on this management unit.

In determining that portion, I accept Teal Cedar's argument that it is essentially on the cusp of a significant migration into the second-growth areas, and that the start-up of the company's new sawmill may be a significant stimulus in that regard. For the coming five years I will accordingly allow for a ramping-up of second-growth harvesting. If that ramping up is not relatively rapid, however, the contribution that the Moresby Island MU makes to the TFL's AAC will likely be much less in the next determination.

TFL as a Whole

As discussed above under *'timber supply analysis'*, the licensee did not provide an aggregated forecast representing the timber supply for TFL 47 as a whole. I therefore asked BCFS staff to produce an aggregated forecasts for me. The resulting forecast, which represents the base case timber supply for TFL 47, projected an initial harvest level of 857 210 cubic metres per year which is about 18 percent higher than the current AAC of 725 000 cubic metres per year. After the second decade, the forecast declined to a low of about 827 000 cubic metres per year in the fourth decade before increasing to the long-term harvest level in about the 16th decade. The mid-term decline in the forecast results from the decline projected in the base case for the Bonanza Lake MU.

When considering projected harvest levels that are higher than the current AAC, except when necessary for an explicit, large-scale salvage program, I believe an AAC should not be increased if it is expected to decrease in the reasonably near future. The only factors in the TFL 47 timber supply analysis that would act to lessen the projected decline, is the apparent underestimate of site productivity on the Bonanza Lake and Moresby Island MUs. However, that impact is insufficient to eliminate the decline in timber supply during the mid-term period. The magnitude of the decline would be in the order of 30 000 cubic metres relative to the modelled initial harvest rate.

I believe that the overall timber supply for TFL 47 is reasonably stable, and that it is higher than previously projected. I believe that after accounting for all of the factors described in this document, and the fact that the sum of base case forecasts is projected to

decline in two decades, a reasonable harvest level at this time is 780 000 cubic metres per year. This increase of about 7 percent from the current AAC is primarily attributable to the fact that large areas of second-growth timber are now reaching merchantable size and economic volume per hectare.

Determination

I have considered all of the factors described in this document, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved on TFL 47 by establishing an AAC of 780 000 cubic metres, of which I attribute:

- 500 000 cubic metres to the Johnstone Strait Management Unit;
- 180 000 cubic metres to the Bonanza Lake Management Unit; and
- 100 000 cubic metres to the Moresby Island Management Unit.

Because of the high contribution that second-growth areas make to the modelled timber supply on the Moresby Island MU, and in the interests of stabilizing timber supply, I conclude that no more than 60 000 cubic metres per year, on average, should be harvested from old-growth stands in the Moresby Island MU during the period when this determination is in effect.

This determination is effective August 1, 2003 and will remain in effect until a new AAC is determined, which must take place within five years of the date of this determination, unless the re-determination date is formally postponed according to the provisions of Section 8 of the *Forest Act*.

If additional significant new information is made available to me, or major changes occur in the management assumptions upon which I have predicated this decision, then I am prepared to revisit this determination sooner than the five years required by legislation.

Temporary Reduction

For as long as the *Central Coast Designated Area Regulation* applies to Hanson Island, the chief forester's July, 2002 AAC reduction will remain in effect. This means that my determination is adjusted for that period of time as follows:

Area	New AAC Attribution (cubic metres)	Reduced AAC Attribution for Duration of "Designated Areas" (cubic metres)
Johnstone Strait Management Unit	500 000	492 000
Bonanza Lake Management Unit	180 000	180 000
Moresby Island Management Unit	100 000	100 000
Total TFL 47 AAC	**780 000**	**772 000**

Implementation

In the period following this decision and leading to the next AAC determination, I request that the licensee:

- give a high priority to completing a forest cover re-inventory of the Johnstone Strait and Moresby Island MUs;
- investigate site indices on the Bonanza Lake and Moresby Island MUs by establishing local studies to validate the SIBEC work already completed;
- assess volume and growth losses attributable to variable retention harvesting;
- review the estimation of volume losses attributable to wildlife tree patches to improve the accounting for timber supply impacts;
- provide a harvest forecast and sensitivity analyses for the TFL as a whole;
- provide alternative harvest forecasts for the TFL as a whole.

In addition, I expect the next TFL Management Plan to include an explicit strategy for conserving and, where necessary, recruiting, cedar to meet the cultural needs of First Nations across all three management units. I encourage the licensee to engage First Nations on this matter well in advance of the date when the next Management Plan is due.

Ken Baker

Ken Baker
Deputy Chief Forester

July 28, 2003

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, reads as follows:

Allowable annual cut

8. (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

(a) makes an order under section 7 (b) respecting a timber supply area, or

(b) amends or enters into a tree farm licence to accomplish the result set out under section 39 (1) (a) to (d),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

(c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and

(d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

(3) If

(a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(3.1) If, in respect of the allowable annual cut for a timber supply area or tree farm licence area, the chief forester considers that the allowable annual cut that was determined under subsection (1) is not likely to be changed significantly with a new determination, then, despite subsections (1) to (3), the chief forester

(a) by written order may postpone the next determination under subsection (1) to a date that is up to 10 years after the date of the relevant last determination, and

(b) must give written reasons for the postponement.

(3.2) If the chief forester, having made an order under subsection (3.1), considers that because of changed circumstances the allowable annual cut that was determined under subsection (1) for a timber supply area or tree farm licence area is likely to be changed significantly with a new determination, he or she

(a) by written order may rescind the order made under subsection (3.1) and set an earlier date for the next determination under subsection (1), and

(b) must give written reasons for setting the earlier date.

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to

(a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and

(b) different types of timber and terrain in different parts of private land within a tree farm licence area,

(c) [Repealed 1999-10-1.]

(6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.

(7) The regional manager or the regional manager's designate must determine a rate of timber harvesting for each community forest agreement area, in accordance with

(a) the community forest agreement, and

(b) any directions of the chief forester.

(8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

(iii) silviculture treatments to be applied to the area,

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

1998-29-2; 1999-10-1; 2000-6-2; 2002-25-21.

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Appendix 2: Section 4 of the *Ministry of Forests Act*

Section 4 of the *Ministry of Forests Act* (consolidated 1988) reads as follows:

Purposes and functions of ministry

4. The purposes and functions of the ministry are, under the direction of the minister, to

(a) encourage maximum productivity of the forest and range resources in British Columbia;

(b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;

(c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are co-ordinated and integrated, in consultation and co-operation with other ministries and agencies of the government and with the private sector;

(d) encourage a vigorous, efficient and world competitive timber processing industry in British Columbia; and

(e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

Documents attached:

Appendix 3: Minister of Forests' letter of July 28, 1994

Appendix 4: Minister of Forests' memo of February 26, 1996

File: 10100-01

JUL 2 3 1994

John Cuthbert
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear John Cuthbert:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the clear responsibility for determining Allowable Annual Cuts, decisions with far-reaching implications for the province's economy. The *Forest Act* provides that you consider the social and economic objectives of the Crown, as expressed by me, in making these determinations. The purpose of this letter is to provide this information to you.

The social and economic objectives expressed below should be considered in conjunction with environmental considerations as reflected in the Forest Practices Code, which requires recognition and better protection of non-timber values such as biodiversity, wildlife and water quality.

The government's general social and economic objectives for the forest sector are made clear in the goals of the Forest Renewal Program. In relation to the Allowable Annual Cut determinations you must make, I would emphasize the particular importance the government attaches to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

Through the Forest Renewal Plan, the government is taking the steps necessary to facilitate the transition to more value-based management in the forest and the forest sector. We feel that adjustment costs should be minimized wherever possible, and to this end, any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.

.../2

Province of
British Columbia

Minister of
Forests

Parliament Buildings
Victoria, British Columbia
V8V 1X4

In addition to the provincial perspective, you should also consider important local social and economic objectives that may be derived from the public input on the Timber Supply Review discussion papers where these are consistent with the government's broader objectives.

Finally, I would note that improving economic conditions may make it possible to harvest timber which has typically not been used in the past. For example, use of wood from commercial thinnings and previously uneconomic areas may assist in maintaining harvests without violating forest practices constraints. I urge you to consider all available vehicles, such as partitioned cuts, which could provide the forest industry with the opportunity and incentive to demonstrate their ability to utilize such timber resources.

Yours truly,

Andrew Petter
Minister

Province of British Columbia
OFFICE OF THE MINISTER

Ministry of Forests

MEMORANDUM

File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

Re: The Crown's Economic And Social Objectives Regarding Visual Resources

Further to my letter of July 29, 1994, to your predecessor, wherein I expressed the economic and social objectives of the Crown in accordance with Section 7 of the *Forest Act*, I would like to elaborate upon these objectives as they relate to visual resources.

British Columbia's scenic landscapes are a part of its heritage and a resource base underlying much of its tourism industry. They also provide timber supplies that are of significant economic and social importance to forest industry dependent communities.

Accordingly, one of the Crown's objectives is to ensure an appropriate balance within timber supply areas and tree farm licence areas between protecting visual resources and minimizing the impact of such protection measures on timber supplies.

As you know, I have directed that the policy on management of scenic landscapes should be modified in light of the beneficial effects of the Forest Practices Code. In general, the new policy should ensure that establishment and administration of visual quality objectives is less restrictive on timber harvesting. This change is possible because alternative harvesting approaches as well as overall improvement in forest practices will result in reduced detrimental impacts on visually sensitive areas. Also, I anticipate that the Forest Practices Code will lead to a greater public awareness that forest harvesting is being conducted in a responsible, environmentally sound manner, and therefore to a decreased public reaction to its visible effects on the landscape. In relation to the Allowable Annual Cuts determinations that you make, please consider the effects that the new policy will have in each Timber Supply Area and Tree Farm Licence.

.../2

In keeping with my earlier letter, I would re-emphasize the Crown's objectives to ensure community stability and minimize adjustment costs as the forest sector moves to more value-based management. I believe that the appropriate balance between timber and visual resources will be achieved if decisions are made consistent with the ministry's February 1996 report *The Forest Practices Code: Timber Supply Analysis*.

Finally, in my previous letter I had asked that local economic and social objectives be considered. Please ensure that local views on the balance between timber and visual resources are taken into account within the context of government's broader objectives.

Andrew Petter
Minister of Forests